No.	Section	Page Line(s)	Comment	Code
Comments on Section 9 of the RI Report				
1	9.2.1 (Main Body of RI Report)	pp. 9-5	Although Section 7.5 of Appendix G states that lamprey were evaluated for exposure to TZW, the results of this evaluation are not clearly presented in the BERA. This is in part, because the TZW line of evidence was inappropriately dropped from the risk characterization and was not used to identify chemicals that pose unacceptable risk to aquatic receptors.	Issue
2	9.2.4 (Main Body of RI Report)	pp. 9-13	The following statement is likely open to debate: *"…the ability of benthic organisms to limit their exposure to anoxic porewater diminishes the ecological relevance of a TZW exceedance."* Please support this statement with references from scientific literature or primary research data. This discussion should be limited to the uncertainty analysis.	Clarify
3	9.4 (Main Body of RI Report)	pp. 9-15	The following statement occurs in the second paragraph in this subsection: "*The TRVs used to calculate HQs were based on organism-level effects that do not translate into population-level responses.*" This statement is inconsistent with EPA Guidance, which states that "*Levels that are expected to protect local populations and communities can be estimated by extrapolating from effects on individuals and groups of individuals using a lines-of evidence approach.*" EPA believes that the approach used to consider population level effects based on measurement endpoints in the BERA are appropriate and consistent with EPA guidance. The draft BERA should be revised accordingly.	Clarify
General Comments on Appendix G of the RI Report (Baseline Ecological Risk Assessment)				
4	General	NA	EPA has not included comments on the evaluation of benthic risk as measured through sediment bioassays and the application of sediment quality guidelines at this time. EPA is developing a benthic approach based on our review of the draft Baseline Risk Assessment and the Benthic Reanalysis Technical Memorandum dated November 13, 2009 and the Site-Specific SQGs based on Individual	Note

No.	Section	Page Line(s)	Comment	Code
			Bioassay Endpoints dated April 2, 2010. Our review may determine that some lines of evidence for evaluating benthic risk more appropriately fall into the category of risk management rather than risk assessment.	
5	General	NA	Under CERCLA, baseline risk assessments are intended to be informational documents. The August 19, 2009, draft BERA is written as a decisional document, with the decisions being which of a lengthy list of chemicals of concern pose unacceptable ecological risks to one or more ecological receptors. This is a major flaw in the BERA which, if not corrected in subsequent drafts, will result in the BERA failing to meet a specific objective of the ecological risk assessment process under CERCLA, as stated in OSWER Directive 9285.7-17, Role of the Ecological Risk Assessment in the Baseline Risk Assessment, namely, to identify and characterize the current and potential threats to the environment from a hazardous substance release. The draft BERA as written does not fully characterize current and potential threats to the environment. Because of the decisions made to go beyond characterization of threats to the environment, the conclusions of the BERA only provide a partial picture of current and potential threats, not the complete picture needed by risk managers to make remedial decisions. A number of EPA's comments on the draft BERA are focused on identifying the areas where the LWG has made risk management decisions, along with recommendations on how to modify the draft BERA so that it provides a more complete description of potentially unacceptable ecological risks at the Portland Harbor site, which is the information risk managers need during subsequent stages of the RI/FS process to inform their remedial decision making.	Issue
6	General	NA	Numerous instances exist where identified unacceptable risks have been dropped out of the BERA prior to completion of the risk characterization sections of the BERA. Other required lines of evidence in the BERA, including comparison of bulk sediment chemistry concentrations to sediment TRVs, received only cursory evaluation or no evaluation at all. EPA requires quantification and tabulation of all identified unacceptable risks in	Directed Change

No.	Section	Page Line(s)	Comment	Code
			the risk characterization sections of the document, per the February 15, 2008, EPA direction on problem formulation and its subsequent modifications and amendments (e.g., tissue TRV derivations, toxicity test reference envelope calculations). This includes unacceptable risks of any magnitude for all chemicals, where risks are identified to any receptors and from any exposure pathways, including unacceptable risks found only in localized areas of the site.	
7	General	NA	Chemicals of Concern are defined in EPA policy and guidance according to the following definitions: 1. A subset of the COPCs that are identified in the RI/FS as needing to be addressed by the response action proposed in the ROD (Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, July 1999). 2. The hazardous substances, pollutants, and contaminants that, at the end of the risk assessment, are found to be the risk drivers or those that may actually pose unacceptable human or ecological risks (Role of Background in the CERCLA Cleanup Program. April 2002). For the purpose of the Portland Harbor BERA, chemicals with hazard quotients ≥ 1.0 should be identified as posing potentially unacceptable risk at the Portland Harbor site. This list of chemicals should used to identify COCs in the draft FS. Consistent with EPA policy on risk, the risk assessment information must be clearly presented separate from any non-scientific risk management considerations.	Directed Change
8	General	NA	Failure to carry all identified potential risks through the end of the risk characterization provides an incomplete description of potentially unacceptable risks. Failure to identify all chemicals with hazard quotients ≥ 1.0 at the conclusion of the BERA as posing potentially unacceptable ecological risks is inconsistent with EPA national risk assessment policy and guidance. Despite being a PRP group-prepared BERA with EPA oversight, the BERA remains the	Directed Change

No.	Section	Page Line(s)	Comment	Code
			responsibility of EPA under CERCLA per EPA's January 26, 1996, Revised Policy on Performance of Risk Assessments During Remedial Investigation/Feasibility Studies (RI/FS) Conducted by Potentially Responsible Parties (OSWER Directive 9835.15c). The BERA must comply with all applicable EPA risk assessment policy, guidance and site-specific direction, and must identify all chemicals with hazard quotients ≥ 1.0 as posing unacceptable risk to ecological receptors.	
9	General	NA	The decisions to drop certain unacceptable risks from the risk characterization are risk management decisions which are not within the purview of the Lower Willamette Group to make and which are inappropriate to make in a BERA in any event. Under CERCLA, baseline risk assessments are informational documents, not decisional documents. One appropriate place for LWG to make its risk management recommendations within the RI/FS construct is Section 11.4 of the BERA (Conclusions and Risk Management Recommendations). Risk management decisions are inappropriately pervasive throughout the BERA, and must not be made in the RI report until after the risk characterization sections of the BERA are complete. EPA is responsible for making the risk management decisions at the site. EPA will not accept the BERA until all potentially unacceptable risks are identified, quantified, and tabulated in the conclusion portion of the risk characterization sections of the BERA. Based on EPA's pending review of the benthic risk reevaluation technical memorandum, EPA may identify lines of evidence that are not sufficiently reliable for use in the BERA.	Directed Change

No.	Section	Page Line(s)	Comment	Code
10	General	NA	There is a willingness in the BERA to accept without question the identified uncertainties in the BERA – things that we do not know – as a basis to minimize or eliminate identified risks, but an unwillingness to accept what we are certain about and do know – that multiple chemicals are present in sediment, surface water, transition zone water, and tissues at concentrations posing potentially unacceptable levels of risk to multiple ecological receptors, and that some site sediments contain contaminants at levels that cause measurable reductions in survival and biomass of benthic invertebrates. The uncertainty analyses, which we consider reliability discussions to be part of, are improperly used to eliminate everything from individual chemical-receptor pairs up to entire lines of evidence from consideration in the final conclusions of the BERA. It is appropriate to use this type of information as part of a weight of evidence evaluation However, it is unacceptable to use uncertainty analyses to eliminate chemicals with HQ's ≥ 1 lines of evidence from the BERA. All chemicals posing potentially unacceptable risk as evidenced by a HQ ≥ 1 from all lines of evidence must be identified in the risk characterization, and forwarded to the FS.	Directed change
11	General	NA	Identify all chemicals with hazard quotients ≥ 1.0 as posing potentially unacceptable risk. This information should be used to identify COCs in the FS. This is consistent with the definition of COCs presented in OSWER 9200.1-23P (1999 guide to preparing records of decision and other remedy selection decision documents) and OSWER 9285.6-07P (2002 role of background in the CERCLA cleanup program). OSWER 9285.6-07P defines chemicals of concern as "*the hazardous substances, pollutants, and contaminants that, at the end of the risk assessment, are found to be the risk drivers or those that may actually pose unacceptable human or ecological risks*." EPA guidance for determining if risks are unacceptable is found in the EPA 1991 Role of the Baseline Risk Assessment in Superfund Remedy Selection (OSWER Directive 9355.0-30), which states that where hazard quotients are less than 1, remedial action is generally not warranted.	Directed Change

No.	Section	Page Line(s)	Comment	Code
			In the BERA, identify all chemicals with a hazard quotient ≥ 1.0, without exception, as chemicals posing potentially unacceptable risk be forwarded to the feasibility study. The EPA risk manager will then make the determination of the basis for site remediation.	
12	General	NA	Remove all statements within the BERA—in text, tables, figures, call out boxes and attachments—along the lines of "*although chemical X was identified as a chemical of concern (COC), chemical X does not pose unacceptable risks.*" There are many variations of this wording throughout the BERA: identification of all of them would result in a list of literally hundreds of editorial comments. Simply identify the chemicals posing potentially unacceptable risk at the end of the risk assessment.	Directed Change
13	General	NA	The weight of evidence (WOE) evaluations throughout the document do not follow the approach given in the EPA February 15, 2008, Problem Formulation for the site. Because this is a complex issue with many possible approaches, some qualitative, some quantitative, EPA offered to meet with LWG prior to completion of the draft BERA to discuss, refine, or modify the EPA's proposed WOE approach. The LWG did not take up EPA on this offer, which still stands during the revision of the draft BERA. As stated in previous comments, chemicals with HQ ≥ 1.0 must be identified as chemicals posing potentially unacceptable risk. The relative strength of any line of evidence may be discussed in the risk characterization.	Issue
14	General	NA	Uncertainty analyses. There is little or no discussion of factors which underestimate risks. The uncertainty discussions throughout the BERA are almost completely focused on factors which overestimate risks, which leads readers of the BERA to conclude that risks are overestimated. While this is likely the case in many instances due to the inherently conservative nature of risk assessment, there are instances where risks are underestimated throughout the BERA. Factors which underestimate risks must also be discussed in the appropriate sections of the BERA. Some factors which underestimate risks include:	Issue

No.	Section	Page Line(s)	Comment	Code
			Unavailability of toxicity reference values for some chemicals; chemicals not analyzed or detected but that may contribute to site risks; existing toxicity benchmarks, particularly LOAEL-based benchmarks, that may underestimate risks for sensitive species; and the elimination from discussion of multiple lines of evidence and/or identified chemicals with hazard quotients greater than or equal to unity which pose unacceptable risks. Also discuss uncertainties that underestimate risks in the BERA.	
15	General	NA	Uncertainty analyses. There is little or no discussion of factors which, depending on context or site-specific conditions, can either underestimate or overestimate risks. The uncertainty discussions throughout the BERA focus almost completely on factors which overestimate risks, which leads readers of the BERA to the conclusion that risks are overestimated. Examples of uncertainties which can either under- or overestimate risks include: interactions among the multiple chemicals present at the site (synergism, antagonism), and metabolic processes of accumulated chemicals (activation, detoxification). Discuss these types of uncertainties in the appropriate locations within the BERA.	Issue
16	General	NA	Important and prevalent dioxin and furan congeners are dropped in surface water, transition zone water, sediment and invertebrate tissue discussions due to "no SLV/TRV". However, where appropriate, TRVs should be derived using TEFs (e.g., fish exposure to sediment, TZ water and surface water) and an appropriate 2,3,7,8-TCDD. For aquatic biota besides fish for which TEFs are not available, total dioxin / furan concentration (sum of 12 congeners) should be compared to the 2,3,7,8-TCDD SLV. It is defensible to assume that toxicity in this case would be similar to TCDD. In either case, the risk assessment needs to acknowledge that there are other dioxin and furan risk drivers besides 2,3,7,8-TCDD and these should be carried through the screening process. Concentrations for these congeners should be presented in the risk screening.	Issue

No.	Section	Page Line(s)	Comment	Code
17	General	NA	Final risk characterization presented in Appendix G focuses on site-wide risk. Receptor exposure scenarios outlined by EPA in the problem formulation are not followed, and risk characterization is based on scenarios proposed by the LWG in this document. The result is that site-wide risk is emphasized, while localized risk is downplayed. As examples, note that many contaminants showing an HQ ≥ 1 were dropped in fish, invertebrate, amphibian, and plants. PRGs were not developed for these compounds.	Issue
18	General	NA	Revise the uncertainty section to present a more balanced assessment of uncertainty. In particular, discuss the uncertainty that is evident throughout the document in how chemicals are dropped due to high detection limits, no TRVs, or uncertainty in the final selection of exposure and effect estimates.	Revise
19	General	NA	Detection limits for toxaphene exceeded the TRV for some tissue samples. Because of this, retain toxaphene as a chemical posing potentially unacceptable risks, but whose risks cannot be quantified. Discuss this in the uncertainty section.	Clarify
20	General	NA	It would be helpful to include the calculated HQs in the tables, instead of just showing an X for an HQ > 1.	Revise
21	General	NA	The methods used in the BERA are poorly described and incompletely documented. Specifically, each section of the document should include a detailed description of the methods that were used to evaluate exposure, to evaluate effects, and to characterize risks to ecological receptors.	Clarify
22	General	NA	This document should be a scientific data report and evaluation. However, many instances of bias in interpretation occur throughout. Remove these. In addition, there are many cases throughout the document where statements are made with no supporting documentation cited. Add references to support scientific statements.	Clarify

No.	Section	Page Line(s)	Comment	Code
23	General	NA	Fish were assessed based on risk from individual contaminants, yet they are exposed to a complex mixture. Some of the mixture is composed of chemicals that have been shown to pose a risk based on a HQ ≥ 1 and some of the mixture also consists of chemicals that were not identified as posing risk based on a HQ ≤ 1 but may contribute to toxicity. Additivity of individual contaminant risk is a reasonable assumption, especially for chemicals acting via the same mode of action. As a result, sum the HQs for individual compounds to assess the risk from multiple contaminants.	Issue
24	General	NA	None of the uncertainties discussed in the BERA address the adequacy of the data collected as part of the RI and how effectively the PH area was characterized. Sampling is an important part of the uncertainty that is not addressed and should be included uncertainty evaluation.	Issue
Specific Comments on Appendix G of the RI Report (Baseline Ecological Risk Assessment)				
25	Executive Summary	p. ES-1, Line 3	Revise the first sentence of the Executive Summary to also state that the BERA was also prepared following the direction in the EPA prepared February 2008 problem formulation.	Clarify
26	Executive Summary	p. ES-2, Line 13	The first bullet on page ES-2 is the first of many instances in the draft BERA where inappropriate risk management decisions are described and made in the BERA. The statement that "*the majority of COCs identified in the draft BERA were determined to pose no unacceptable risks to ecological populations or communities*" is incorrect. All chemicals with hazard quotients ≥ 1.0 potentially pose unacceptable ecological risks and must be identified as such in the BERA. Whether or not the risks are unacceptable and rise to a level requiring remediation is a risk management decision that will be made by EPA. The objective of the BERA is to describe all potentially unacceptable risks and their associated uncertainties.	Directed change

No.	Section	Page Line(s)	Comment	Code
27	Executive Summary, Sec. 7.1.4.3.3	p. ES-2; and p. 265, Line 38	The 7th bullet on page ES-2 is another example of an inappropriate risk management decision in the BERA. While EPA agrees with the LWG that mercury contamination is a greater Willamette River issue requiring watershed-scale risk management, this conclusion is a risk management decision, not a risk assessment conclusion, and is inappropriate to discuss in the BERA. Limit the risk assessment conclusions for mercury in the BERA to the identified unacceptable risks, such as those described in, for example, Tables 11-1 and 11-2.	Issue
28	ES	p. ES-2, Lines 13-15	The statement identifying 31 COCs is not correct. EPA has identified 101 chemicals (or sums or totals of chemicals such as total DDx) where at least one line of evidence has at least one chemical with a hazard quotient ≥ 1. Pending final review of the benthic reanalysis memorandum, EPA has identified 228 chemical-line of evidence pairs with hazard quotients greater than or equal to 1. These 228 combinations of chemicals and lines of evidence potentially pose unacceptable ecological risks and must be identified as such in the BERA. Some chemicals, such as those noted by the LWG in the BERA for total PCBs, pose potentially unacceptable risks to multiple receptors or within multiple lines of evidence. Thus, PCBs occur more than once in the 228 chemical-lines of evidence pairs. All the chemicals posing potentially unacceptable risks should be used to help identify COCs in the FS. A separate table identifying these chemicals is included as an attachment to these comments for use by the LWG in modifying the BERA.	Issue
29	ES	p. ES-2, Lines 19-26	The statement that bioaccumulation of PCBs by receptors and their prey poses the most significant ecological risks is a subjective statement that poses many issues. Although the highest mink dietary hazard quotient for PCBs is 33, which we agree is elevated, the maximum PCB hazard quotient to benthic invertebrates in sediment is 111, higher than the mink maximum PCB hazard quotient, arguably as significant as – if not more significant than – the mink PCB hazard quotient. Although it is appropriate for the risk assessment to identify the chemicals and pathways that contribute the majority of the risk, subjective statements regarding	Issue

No.	Section	Page Line(s)	Comment	Code
			the relative importance if a receptor group should be eliminated from the BERA.	
30	ES	p. ES-2, Lines 19-26	The statement regarding reduction or elimination of other contaminant risks as a collateral benefit of mink PCB remedies is unsupported by any information in the BERA, as it presumes a remedy for the site that has not been identified as of the date the draft BERA was submitted to EPA. Remediation of PCBs to reduce risk to mink may not reduce all risks from all contaminants to all receptors. One example of this is the Swan Island Lagoon shipyard, where tributyltin risks in multiple media and to multiple receptors are important, and may drive remediation in that location, even though tributyltin risks in the entire Portland Harbor site are largely limited to the Swan Island Lagoon shipyard, and are not as widespread as PCB risks. This is one of many areas in the draft BERA where there appears to be a preconceived notion that remediation of PCBs will address other contaminants that also pose a risk to ecological receptors. The BERA is not the place for the LWG to propose remedial decisions, and all language in the BERA proposing a remedy for a specific chemical, location(s) or media must be eliminated from the next draft of the BERA.	Issue
31	ES	p. ES-2, Lines 34-36	Transition zone water samples provide numerous instances where chemicals of concern can be identified that are not found throughout the study area, but which instead appear associated with specific locations and sources. Of the 101 chemicals of concern, 37 were identified only in transition zone water. Further, it is likely that the TZW data identify areas of the site with substantially higher risks than are found at the majority of the site.	Issue
32	ES	p. ES-3, Line 14	Global editorial change: the phrases "individual level risks" or "individual level risk assessment" should be changed to "organism level risks" or "organism level risk assessment". An individual is not a level of biological organization, whereas an organism is a level of biological organization.	Revise

No.	Section	Page Line(s)	Comment	Code
33	Executive summary	p. ES-3; p. 530 of main text, Lines 3-4	The Executive Summary states that, "*Unacceptable risks of the re-exposure of buried contaminated sediment within the Study Area are low on a harbor-wide scale.*" A similar statement appears on page 530: "*The possible re-exposure of buried contaminated sediment within the Study Area as the result of a high flow event is unlikely to increase unacceptable ecological risk.*" These statements are unsupported by any risk analysis in the draft BERA. Either support these statements or remove them from the text.	Issue
34	Executive summary	p. ES-3, Lines 9-14	The statement "*not all COCs pose unacceptable ecological risk*" and its associated discussion are incorrect. Identify all chemicals identified as posing some level of potentially unacceptable risk as such in the BERA.	Revise
35	Executive summary	p. ES-3, Line 18	Revise the sentence that discusses nutritional requirements of essential metals so that it concludes as follows: *" . . . because they were below nutritional requirements for some, but not all species."*	Revise
36	Executive summary	p. ES-5, Lines 13-16	While EPA agrees that organism to population or community level effects extrapolations are a source of uncertainty, this uncertainty is not as large as the BERA makes it out to be, and can underestimate as well as overestimate risks to receptors. In the BERA, quantify in how many cases, if any, the use of LOAELs will identify COPCs that do not pose unacceptable risks to populations or communities. Water quality criteria, for example, are community-level endpoints that are designed to protect taxa richness, but may not be protective of individual organisms, including individual organisms of threatened and endangered species. Give a more complete discussion of this issue, and if the number of cases where	Edit

No.	Section	Page Line(s)	Comment	Code
			the use of LOAELs will identify COPCs that do not pose unacceptable risks to populations or communities cannot be identified, remove the last sentence of this paragraph from the text.	
37	Executive summary	p. ES-5, Lines 21-22	Despite the claim in the BERA text, a sample by sample scale for the exposure assessment is the ecologically relevant exposure scale for most benthic invertebrates and aquatic plants, whose combined species richness is likely higher than that of any other category of ecological receptors at the Portland Harbor site. Given the data density of water and sediment samples, it may also be the appropriate exposure scale for sculpin, at least at some locations within the site. Therefore, the sample by sample exposure scale is the ecologically relevant exposure scale for the numerically dominant taxa at the site. Modify the BERA text to reflect this.	Clarify
38	Executive summary	p. ES-6, Line 18	EPA's review of the BERA has identified a total of 101 chemicals posing potentially unacceptable risk when the results of the analysis of all measurement endpoints and lines of evidence are combined. Correct the text to reflect this.	Revise
39	Executive summary	p. ES-6, Lines 20-21	The BERA states that the draft BERA conclusions are indeterminate for COCs with data limitations. The meaning of this sentence is unclear. Expand and/or clarify this statement or, if this is not possible, eliminate the statement.	Clarify
40	Executive summary	p. ES-6, Lines 21-23	Eliminate the following sentence: "*In some cases, such as where the spatial extent of TRV exceedances is small, or where TRVs are based on very conservative assumptions, a conclusion that a chemical poses negligible risk to a receptor is warranted even for COCs*." This sentence is inconsistent with EPA's national risk assessment guidance and policy on several levels. The spatial extent of any given risk may be limited, but areas with a small spatial extent of risks may be critical habitats whose importance is larger than the limited spatial extent may at first indicate (OSWER Directive	Issue

No.	Section	Page Line(s)	Comment	Code
			9285.7-28P). EPA's Guidance on Risk Characterization for Risk Managers and Risk Assessors (February 26, 1992) is one of several EPA guidance and policy documents that clearly state that risk assessors do not make decisions on the acceptability of any risk level for protecting the environment. Furthermore, this guidance goes on to state that risk assessors are to select, evaluate and present scientific evidence without consideration of non-scientific factors, including how the risk assessment might influence the regulatory decision. Numerous statements throughout the BERA, such as this one in the Executive Summary, claim that a chemical poses negligible risks even if identified as a chemical of concern. Remove these statements from the BERA, as they are risk management decisions, not information on ecological risks.	
41	Executive summary	p. ES-6, Lines 24-30	The failure of the BERA to carry forward the transition zone water line of evidence is one of the major failures of the BERA. Evaluation of this line of evidence was specifically required in EPA's February 15, 2008, Problem Formulation. By not identifying chemicals potentially posing unacceptable risk for this line of evidence, the BERA has failed to identify 62 chemicals, including those chemicals that have by far the highest hazard quotients of any line of evidence in the entire BERA. Among these are 10 chemicals whose maximum hazard quotients exceed 1000. This results in a major underestimation of site risks. As correctly stated in the BERA, many benthic organism have abilities and mechanisms by which they can limit their exposure to contaminants. However, these mechanisms and behaviors do not modify the chemical concentrations in TZW that elicit toxicity. Also, for immobile benthic species, the evaluation of risks on a point-by-point basis is the appropriate spatial scale of risk analysis. Thus, we also do not agree that the approach used to evaluate TZW diminishes the ecological relevance of the analysis. The TZW risks must be fully described in the BERA, and all chemical ins TZW	Directed Change

No.	Section	Page Line(s)	Comment	Code
			with a HQ ≥ 1 – with the exception of aluminum – must be forwarded to the feasibility study.	
42	Executive summary	p. ES-6, Lines 31-41	At least 46 chemicals in sediment and 62 chemicals in transition zone water have HQ's ≥1. These should be identified s chemicals potentially posing unacceptable risk. See the attached table.	Issue
43	Executive summary	p. ES-3, Lines 10-14; p. ES-7, Lines 1-5	EPA risk assessment policy and guidance is clear that extrapolation of organism-level effects to estimate population- or community-level effects is an acceptable approach within ecological risk assessments. The point-by-point risk estimation methodology is appropriate for ecological receptors with limited or no mobility, which includes many benthic invertebrates. Therefore, the statement that the approach is not relevant for assessing population or community risks is not correct. Eliminate this statement..	Issue
44	Executive summary, Section 2, 2.2.1	p. ES-7, Lines 6-18; pp. 13-26	EPA was pleased to see the discussion of sediment profile imaging in the BERA. This was not identified as a line of evidence in the BERA, but does provide useful information on site conditions. EPA agrees with the LWG's general contention that the condition and health of the benthic community is a function of both habitat features of the site, including man-made modifications to the Willamette River, and the release of hazardous substances to the Willamette River. The relative proportions of the effects of habitat and contamination on the benthic community cannot be quantified with the existing information from the site. One general concern EPA has about the benthic community discussions throughout the BERA is that there appears to be little if any discussion of the LWG's several efforts to obtain a sufficient mass of soft-bodied benthos for chemical analysis. The limited biomass of many benthic taxa may be indicative of contaminant effects on benthic invertebrates. Discuss this uncertainty more fully in the BERA.	Clarify

No.	Section	Page Line(s)	Comment	Code
45	Executive summary	p. ES-7, Footnote 7	Footnote 7 is not correct as written. The term "potential" (or "potentially" in other locations in the BERA) is primarily used because the EPA risk managers have not yet selected the chemicals of concern that rise to the level of unacceptable ecological risk and which require remediation. Correct the footnote to reflect this.	Revise
46	Executive summary ES.3	p. ES-8, Lines 10-24	The summary of ecological risks to the various fish feeding guilds and species used as target ecological receptors is not correct. Hazard quotients as high as 280 for lead in smallmouth bass tissues, 69 for tributyltin in the diet of sculpins, 31 for chromium in white sturgeon tissues, and 27 for total PCBs in carp tissues are not considered negligible risks by EPA. Remove this subjective statement from the BERA. Given the relatively limited number of fish samples and composites collected and analyzed, the potentially unacceptable risks to fish are found throughout the site. Refrain from making subjective statements about the magnitude of risks, and stick to the quantitative discussions of chemicals posing potentially unacceptable risks; which species have chemicals in their tissues, diets, or within the water column that pose potentially unacceptable risks; the uncertainties in these analyses; and the locations where risks are found.	Issue
47	Executive summary ES.3	p. ES-8, Lines 10-24	Due to the use of several incorrect tissue TRVs, the list of chemicals potentially posing unacceptable ecological to fish may not be completely summarized in the Executive Summary. For example, maximum hazard quotients for cadmium in smallmouth bass, are ≥ 1 using the correct tissue TRV, but is not listed as posing risk to fish tissue. Revise this section after the reanalysis of fish tissue hazard quotients for cadmium, total PCB, total DDX, mercury, and lindane is completed.	Error

No.	Section	Page Line(s)	Comment	Code
48	Executive summary ES.3	p. ES-8, Lines 10-24	The executive summary fails to identify all the chemicals potentially posing unacceptable risk. Ten chemicals potentially posing unacceptable risk were identified for spotted sandpiper (copper, benzo(a)pyrene, dibutyl phthalate, Total PCB, PCB TEQs, dioxin/furan TEQs, dioxin/furan/PCB TEQs, aldrin, total DDEs, total DDxs), and five each for bald eagle and osprey egg lines of evidence (total PCB, PCB TEQs, dioxin/furan TEQs, dioxin/furan/PCB TEQs, 4,4'-DDE). Correct the text corrected to reflect these findings of the BERA.	Clarify, revise
49	Executive summary ES.4	p. ES-8, Lines 30-32	The uncertainty in the bird egg risk analyses is largely due to the limited number of available eggs analyzed, and the few years worth of available egg data, some of which predates the listing of the Portland Harbor site on the National Priorities List, and less because of the biomagnification factors or field-derived TRVs. Revise the text here and in Section 8.1.1 to reflect this.	Expand
50	Executive summary ES.4	p. ES-8, Lines 39-40	The executive summary fails to identify all the chemicals potentially posing unacceptable risk. Five chemicals potentially posing unacceptable risk were identified for mink (lead, total PCBs, PCB TEQs, dioxin/furan TEQs, total dioxin/furan/PCB TEQs). The count of three chemicals for river otter is correct, although the river otter list is total PCB, PCB TEQs and dioxin/furan/PCB TEQs. Clarify and correct the text to reflect this conclusion more accurately.	Clarify
51	Executive summary ES.5	p. ES-9, Lines 15-28	EPA has identified 11 surface water chemicals potentially posing unacceptable risk and 61 transition zone water chemicals potentially posing unacceptable risk for amphibians and aquatic plants. Correct the text to reflect this. EPA's aquatic life criteria include plant data as one of the required eight taxa needed to derive the criteria, and several of the criteria were derived using amphibian toxicity data. The uncertainty regarding the use of water quality TRVs for evaluation of plants is due in part to the relative insensitivity of aquatic plants to most aquatic chemicals relative to fish and invertebrates (herbicides being an obvious exception), while amphibian data are relatively rare in the data sets used	Revise

No.	Section	Page Line(s)	Comment	Code
			to derive water quality criteria, which is an uncertainty in their applicability to assessing amphibian risks.	
52	ES	p. ES-3	The discussion of uncertainty presented in the Draft BERA should not be biased to only explain uncertainties due to "conservatism." Discuss all factors that influence uncertainty. For example, some contaminants (e.g., dioxins) may not have been identified as chemicals potentially posing unacceptable risk but may actually be causing risk. Sampling and/or compositing approach may have diluted/biased concentrations such that risk was not captured.	Issue
53	1	p. 1, Line 4	A goal of any EPA baseline risk assessment is to evaluate the potential threat to human health and the environment in the absence of any remedial action. Amend the second sentence of the introduction to read as follows: *". . . determine if deleterious ecological effects may be occurring at the Study Area under current conditions and in the absence of any remedial actions."*	Revise
54	1	p. 1, Lines 14-27	Reference here another key document describing the procedures used in the BERA: EPA's "Problem Formulation for the Baseline Ecological Risk Assessment at the Portland Harbor Site", dated February 15, 2008, as subsequently amended and modified with items including toxicity reference values (TRVs) for tissues and the reference envelope approach for evaluating benthic toxicity tests.	Revise
55	1	p. 3, Lines 14-27	The following sentence is incorrect: "*This document identifies ecological chemicals of concern (COCs) for which an exceedance of acceptable ecological risk thresholds was found or predicted."* The BERA fails to identify all chemicals potentially posing unacceptable risk due to an inappropriate elimination of certain lines of evidence evaluated in the BERA.	Issue

No.	Section	Page Line(s)	Comment	Code
56	2	All	Revise the BERA to provide a more complete description of the site, including a brief discussion of the tidal and river stage range of the Willamette River in Portland Harbor. In addition, the currently known species richness of fish in the Willamette River is closer to 50 species, not the 40 species mentioned in the text. Revise the text to reflect this. Finally, the introduction to this section may be a good location to discuss, or at least point to discussions in other parts of the remedial investigation report, why the BERA is limited to evaluating in-water and riparian zone risks, and not upland ecological risks.	Revise
57	3.2	p. 58	This section includes a discussion of how tissue residue values (TRVs) were selected and the uncertainty in the results of the BERA that is associated with the TRV selection process. Remove this discussion from this section of the BERA. It is not appropriate for a discussion on the refinement of the CSM, but is more appropriate for inclusion in the Uncertainty section of the BERA.	Revise
58	3.2	p. 58	The discussion in this section should be revised to reflect that surface water is not a line of evidence. Rather, surface water is an exposure pathway; surface-water toxicity chemistry compared to a water TRV is a LOE.	Revise
59	3.2	p. 58, Footnote	Include a brief explanation of why EPA and LWG agreed to perform the belted kingfisher risk analysis in the Uncertainty section instead of in the main risk characterization section.	Clarify
60	3.2	p. 60	The simplified conceptual site model (CSM) is generally consistent with the more detailed CSM in Attachment 2. However, minor discrepancies include the absence of zooplankton and terrestrial plants (in the riparian zone only) as target ecological receptor groups of concern. Give the definitions of the four exposure pathways (complete and significant,	Clarify

No.	Section	Page Line(s)	Comment	Code
			complete and insignificant, incomplete, complete and significance unknown) either as a footnote to the figure or in the associated BERA text. Correct any other discrepancies.	
61	3.2	p. 60	The complete and significant exposure pathway for transition zone water to benthic invertebrates, aquatic plants, amphibian larvae and some fish receptors requires a full analysis of this pathway for these receptor groups, with complete identification of all chemicals of concern incorporated into the risk characterization. Please provide this analysis. Failure to incorporate TZW into the risk characterization is a major flaw in the BERA.	Directed Change
62	3.3	pp. 59 ff, Table 3-1	In the measurement endpoint column for benthic invertebrates, explicitly identify surface water chemistry and transition-zone water (TZW) chemistry (i.e., they are separate LOEs). This also applies to the measurements endpoints that were identified for molluscs, decapods, and certain fish.	Revise
63	3.3	p. 61, Table 3-1	For omnivorous fish, correlation of lesion prevalence with areas of contamination is unlikely to yield useful information because the focal species identified have relatively large foraging ranges. This makes it difficult to draw linkages between exposure and effects. Therefore, evaluate the prevalence of lesions at ecologically relevant spatial scales, and compare this to regionally relevant background levels of lesions.	Revise
64	3.4		In the Analysis Plan, for each receptor group, clearly describe the LOEs that will be used, the procedures that will be used to estimate exposure, the procedures that will be used to select effects thresholds or to evaluate effects directly, the procedures that will be used to characterize risks, and the methods that will be used to integrate multiple LOEs. Also describe in this section the procedures that will be used to evaluate uncertainty.	Revise

No.	Section	Page Line(s)	Comment	Code
65	4	All	Early on, reference the availability of electronic data files with site data, particularly the four data attachment spreadsheets (Attachment 4B, Study Area Data; Attachment 4C, Non-Study Area Data, Attachment 4D, Predicted Tissue Data; and Attachment 4E, Compiled EPCs). EPA has found these attachments, and Attachment 4B in particular, to be clear and readily useable during our BERA review.	Clarify
66	4	p. 75 ff, Table 4-2	In this table, identify the sediment samples collected for toxicity testing.	Clarify
67	4	p. 83 ff, Table 4-4	In the descriptions of the water samples evaluated in the BERA, include information on the water depth from which the samples were collected. Also describe the GeoProbe sampler used to collect water samples for analysis of organic contaminants, either in this table or in the accompanying text. Also describe any calibration of the peristaltic pump sampling against the XAD sampling.	Clarify
68	4	p. 88 ff, Table 4-5	Include a table that reports the DLs that were achieved for the target analytes using the three TZW collection systems. Discuss these DLs in the context of the TRVs that were selected for evaluating the TZW data. This will be important for determining how much of the TZW data are useful for evaluating risks to ecological receptors.	Clarify
69	4		It is not clear from the text how the invertebrate tissue chemistry data, generated by collecting invertebrates using multiplate samplers, was used in the BERA. Importantly, these data represent the concentrations of COPCs in the tissues of invertebrates exposed to overlying water, but not exposed to sediments. Therefore, do not use such data to evaluate risks to benthic macroinvertebrates without clarifying that they are likely to underestimate exposure to site-related COPCs.	Clarify

No.	Section	Page Line(s)	Comment	Code
70	4.1.2	pp. 80-85	Several places in the BERA, starting with the discussion of mercury risks to eagles consuming fish on page 2 of the Executive Summary, discuss elevated risks in fish collected upstream of the Portland Harbor site. In any discussion of the upstream or regional data, acknowledge the differences between fish collected within the study area and those collected outside the study area. For example, EPA understands that many of the fish collected upstream of the site were larger and older than the fish collected from within the Portland Harbor site. This size difference may account in part for the relatively elevated concentrations of some contaminants in upstream fish, such as mercury and high log Kow chemicals such as PCBs and DDx. Given the absence of an approved workplan to collect upstream or reference area fish within the remedial investigation, include a discussion of the fish size effect on bioaccumulated chemical concentrations, or at least a pointer to this discussion in the food web model report. This issue is an uncertainty that may serve to underestimate site risks relative to risks in fish collected upstream of the site.	Issue
71	4.1.2	p. 80	The metabolic ratios for DDT in tissue have a high percent of the DDT metabolite or DDD metabolite for some samples, indicating that there are recent sources of DDT into the River. No discussion of this observation is presented in the RI Report. In the RI Report, identify areas in the river where sources appear to be recent, based on metabolic ratios in fish and in sediment.	Issue
72	4.1.2	p. 82	Describe what percent size difference was acceptable for compositing, and whether genders were mixed.	Clarify
73	4.1.4	p. 89, Line 10	Note that the TZW data used in the BERA were collected using different techniques (30 cm point grab sample and 0 – 38 cm depth and time integrated sample). Further, these depth intervals do not exactly correspond with the roughly 0-30 cm sediment data used in the BERA. Discuss this in the uncertainty section. Discuss also that it may also serve to either over- or underestimate risks to benthic biota, depending on the depth of the	Issue

No.	Section	Page Line(s)	Comment	Code
			biologically active zone and whether the contaminant concentrations below the biologically active zone are lower or higher than concentrations within the biologically active zone.	
74	5.0	p. 97	Identify those chemicals in the various media and samples collected during Round 3 sampling, if any, that were identified as COPCs that had not been listed as COPCs during the SLERA for the Rounds 1 and 2 data as presented in the Comprehensive Round 2 Site Characterization Summary and Data Gaps Report (Round 2 Report). This is important to identify additional COPCs that may require derivation of TRVs for use in the BERA. The EPA prepared SLERA evaluated data collected during Rounds 1 and 2, but some of the Round 3 data were not available at the time the SLERA was prepared. Ensure that the complete chemicals of potential concern list identified during all three rounds of sampling are evaluated in the BERA.	Clarify
75	5, 7, 8, 11		These tables are the summary tables that identify chemicals of concern from the various exposure scenarios and pathways. The use of "X" or filled circles to denote chemicals of concern does not provide sufficient information to risk assessors and managers to evaluate either the magnitude or spatial extent of the identified risks. Make these tables much more informative by including the following information for each identified chemical with a HQ $\geq$1: The total number of samples available, the number of samples where unacceptable risks have been identified, and the magnitude of the risks (e.g., maximum risk, risk range, and a central tendency measure of risk such as the mean or median hazard quotient). The comparison of the number of samples, locations or risk estimates with unacceptable risk compared to the total number of samples, locations or risk estimates with available data allows the reader to identify the contaminants with widespread or site-wide distribution of unacceptable risks vs. those where the spatial extent of risk is limited to one or a relatively few localized areas.	Issue

No.	Section	Page Line(s)	Comment	Code
76	5, 7, 8, 11		Pending completion of EPA's review of the benthic reevaluation memorandum, EPA has identified the chemicals that potentially pose unacceptable risk. The list of these chemicals is provided in the attached table.	Note
77	5.0	pp. 100-103, Table 5-1	This table presents the final list of COPCs from the SLERA and the refined screen. Also present the list of initial COPCs from the SLERA, and provide explanation for the COPCs that were dropped in the refined screen. In addition, provide quantitative information (i.e., HQs) in the table.	Clarify
78	5.1	NA	Present the substances for which no screening values are available in a table, and discuss these generally in the Uncertainty section.	Revise
79	5.1	pp. 98-100	The dioxin (2,3,7,8-TCDD) surface water TRV as given in Attachment 5 (100 pg/L) is not correct. The correct TRV is 10 pg/L. EPA has made this comment previously and provided documentation. As a result, EPA is making this comment as a directed change. Further, this will require that the SLERA for dioxin in surface water and transition zone water be repeated to determine whether dioxin is carried through as a chemical of potential ecological concern (COPC) in surface water and TZW (applies to benthic invertebrates, fish, plants and amphibians).	Directed change.
80	5.1.1	pp. 96-114	The refined screen process described in the EPA February 2008 problem formulation document does not appear to have been completely followed, although in some areas, such as the nutritionally essential metal portion of the refined screen, EPA agrees with LWG's rationale for not performing the screen. Specific discrepancies from EPA direction include: (a) not carrying through as COPCs chemicals detected in sediment with less than 5% frequency, but where 3 or more contiguous sediment samples contained detected concentrations, with at least one sample having a hazard quotient ≥ 1.0; and (b) identification of naturally occurring chemicals at the site that are within the range of regional background. LWG must perform the refined screen following the direction in the February 15,	Clarify

No.	Section	Page Line(s)	Comment	Code
			2008, problem formulation document.	
81	5.2		The refined screen for fish tissues should not be done on a species-by-species basis. Rather, all of the fish-tissue chemistry data should be aggregated and the maximum measured concentration of each COPC should be compared to the TSV for fish. If a substance is retained on this basis, then it should be evaluated in the BERA for each fish feeding guild. The results of that assessment will determine if the substance poses a potential risk to fish representing each feeding guild. The same approach should be applied to the invertebrate-tissue chemistry data.	Issue
82	5.2 and 5.3		COPC refinement based on modeled dietary doses or modeled bird-egg tissue concentrations should not be conducted. Rather, the bioaccumulative COPCs that are retained during the initial screen should be evaluated for all relevant ecological receptor groups in the BERA. This additional screening is not recommended because there are numerous assumptions that need to be made to estimate dietary doses and bird-egg concentrations of COPCs. These assumptions must be transparent to the risk manager to ensure that substances posing potential risks to fish or wildlife are evaluated consistently in the BERA.	Issue
83	6, Attach. 6, and Benthic Reanalysis Memo		There is nothing within EPA's CERCLA guidance and policy which would prohibit quantification of risks from non-hazardous substances such as ammonia or total petroleum hydrocarbon mixtures, although a CERCLA remedy at an NPL listed site generally cannot be based on a non-hazardous substance. The presence of non-hazardous substances such as ammonia and TPH fractions in sediment may explain some of the locations where *Hyalella azteca* biomass was reduced in the 293 stations with measured toxicity. This possibility should be discussed as an uncertainty, or better yet, additional effort made to develop sediment quality benchmarks for these non-hazardous substances in the logistic regression and floating percentile models.	Clarify
84	6.0	p. 115, Table 6-1	*Lumbriculus* (laboratory worms) are missing from Table 6-1 showing benthic invertebrate receptors. Include *lumbriculus* in the table.	Revise

No.	Section	Page Line(s)	Comment	Code
85	6.4	p. 148, Text box	Assessment based on individual samples. This approach is the appropriate exposure scale for numerous benthic invertebrates, aquatic plants, and possibly sculpin, all species which have no mobility or very limited size home ranges. Effects are to the local population or subpopulation of the target ecological receptor, not any one individual organism. The text box fails to discuss this aspect of the risk assessment, but instead tries to leave the impression that the risk assessment is overly conservative. EPA agrees that for some receptors with larger home ranges that encompass multiple sampling locations, calculation of an exposure point concentration based on multiple sampling results pooled in some manner (e.g., arithmetic or geometric mean concentration, 95% upper confidence limit of the mean, etc.) is appropriate, and this is discussed in the problem formulation in multiple locations. LWG was also given the option in the problem formulation to perform probabilistic risk assessments if desired, pending discussions and agreements with EPA on the approach, an option not pursued by LWG. EPA considers the February 15, 2008, problem formulation the minimum amount of assessment to be performed. The LWG has the option to pursue additional risk assessment approaches, including the use of procedures in Oregon's ecological risk assessment guidance.	Issue
86	6.5.1; 6.6.2	p. 173; p. 197	Tributyltin risks in surface water and transition zone water. It does not appear as though the LWG performed any comparisons of surface water and transition zone water concentrations of tributyltin to the EPA aquatic life criterion for tributyltin of 0.072 µg/L. EPA's analysis indicates that at least one surface water and one TZW sample exceed the tributyltin criterion for continuous concentration (CCC, commonly referred to as the chronic water quality criterion). Thus, the report should identify tributyltin as a chemical potentially posing unacceptable risk in surface water and transition zone water for all assessment endpoints where exposure to either surface water or TZW occurs. This includes benthic invertebrates, some fish feeding guilds, aquatic plants, larval amphibians, bivalves and decapods. Comparison of surface water and TZW tributyltin concentrations to the tributyltin CCC must be performed and the results presented for the above	Clarify

No.	Section	Page Line(s)	Comment	Code
			receptor groups in the appropriate sections of the BERA.	
87	6.5	pp. 172 ff	The detection limits for many of the organic compounds were substantially lower based on the XAD extraction compared to the peristaltic pump (Attachment 4). Discuss the impact of these differences on the representativeness of the water samples. For example, PCBs and DDTs were virtually always detected in the XAD samples, but rarely in the pump samples. The XAD samples therefore indicate that PCBs and DDTs are commonly present in the water, a different picture than provided by the merged data set.	
88	6.5.3	p. 179	EPA acknowledges that the AWQCs for certain chemicals are based on bioaccumulation not toxicity to aquatic life. However, EPA would like to remind the LWG that these AWQCs remain ARARs for the site. If LWG wishes to develop aquatic life water TRVs for these chemicals, the evaluation should not be limited to DDT and PCBs, but should include other pesticides for which the water TRV is also bioaccumulation-based (chlordane, heptachlor and heptachlor epoxide). In addition, the LWG must develop these TRVs using an SSD approach, and must document the approach and the data to be employed in the approach to EPA for approval. Alternatively, LWG could just evaluate surface water and TZW risks from PCB, DDT, chlordane, heptachlor and heptachlor epoxide using the published EPA aquatic life criteria, and forego the attempted derivation of alternative TRVs for these chemicals.	Issue
89	6.5.3	p. 179	LWG derived water quality criteria for PCB and DDT. We do not believe the LWG provides sufficient detail for us to fully evaluate the protectiveness of the proposed alternative PCB and DDT water quality TRVs discussed and presented in the text. EPA water quality criteria can be derived by one of several methods (Stephan et al. 1985). The most common approach, a species sensitivity distribution based on toxicity to at least eight specified types of aquatic life taxa, is only one of several allowable approaches. Other allowable methodologies include residue-based approaches to protect FDA action levels, toxicity to plants, toxicity	Issue

No.	Section	Page Line(s)	Comment	Code
			to commercially or recreationally important species, or protection of wildlife consumers of aquatic life. The fact that the EPA aquatic life criteria for PCB and DDT are not based on a species sensitivity distribution does not invalidate their use in the BERA, as they are protective of aquatic life, even though they were not ultimately derived based on protection of aquatic life. The BERA should document the alternative TRV derivation much more thoroughly than in the current draft. EPA does not necessarily object to the LWG evaluating aquatic life risks using a TRV derived solely from aquatic toxicology data, but before EPA will approve such a TRV, the LWG must do a much better job of documenting the alternative TRV derivation than is done in the BERA.	
90	6.5.4.3	pp. 186-188	The approach used in the BERA to address risks from chemicals at or below regional background is not fully consistent with EPA's national policy on risk assessment in the role of background in the CERCLA cleanup program (OSWER 9285.6-07P, May 1, 2002). EPA policy states that the risk characterization should include a discussion of elevated background concentrations of COPCs and their contribution to site risks. While the LWG text for aluminum, for example, in TZW provides this discussion, it then goes on to conclude that aluminum is not expected to pose unacceptable risks to benthic invertebrates. This last part is what conflicts with EPA risk assessment policy for addressing background risks. The BERA must identify all unacceptable risks, including those from chemicals at background and whose concentrations may be unrelated to site discharges. The information provided in the BERA and RI Reports regarding the contribution of background sources vs. site sources of contaminants at background is used by the EPA risk manager to make risk management decisions. It is not to be used to make claims that a chemical is not expected to pose unacceptable risk. EPA has given the LWG specific guidance on how to evaluate aluminum in water risks, which should eliminate the need to make a comparison of aluminum levels in surface water.	Directed Change

No.	Section	Page Line(s)	Comment	Code
91	6.6.1	p. 196	The cyanide TRV as given in Table 6-26 (0.0052 µg/L) is not correct. The correct cyanide TRV is 5.2 µg/L.	Revise
92	6.6.3	p. 202 Text box	Although the text box correctly describes some of the processes by which benthic infauna can reduce their exposure to contaminants in transition zone water, this behavior does not modify the chemical concentrations in TZW that elicit toxicity. It only changes their exposure. As numerous chemicals exceed the TZW TRVs, these chemicals with hazard quotients greater than or equal to unity must by identified as chemicals of concern for the site. The limited spatial coverage of the TZW sampling efforts means that unacceptable risks (or acceptable levels of risk) can only be quantified in the portions of the site with empirical TZW data. Ecological risks at the remainder of the site without empirical TZW samples are unknown, and are thus an uncertainty in the BERA with the potential for underestimating site risks. This possibility must be discussed in the BERA. EPA therefore does not agree with LWG's contention that TZW risks are overestimated in the BERA. For immobile benthic species, the evaluation of risks on a point-by-point basis is the appropriate spatial scale of risk analysis. Thus, we also do not agree with LWG's contention that the TZW data are not representative of the potential for unacceptable risks on a larger spatial scale. Rewrite this section to take into account the possibility that the spatial extent of unacceptable risks to benthic infauna are likely underestimated.	Issue
93	6.6.4	p. 203	Identify risks posed by TZW in the BERA, even if overlap occurs with other lines of evidence. Make it clear that these areas show risk via multiple lines of evidence. Recalculate HQs for TZW and DDX using corrected DDX benchmark.	Clarify
94	6.6.4	pp. 203 ff, Table 6-28	LWG states that "*Water TRV exceedances were not displayed on maps but were considered along with sediment SQG and tissue TRV exceedances; they were found to co-occur with SQG exceedances*."	Clarify

No.	Section	Page Line(s)	Comment	Code
			Display water TRV exceedances on maps.	
95	6.6.5	p. 210	This section is highly biased toward the "benthic organisms have mechanisms to reduce / eliminate exposure" speaking to the ecological relevance of the findings. Present a more balanced discussion in this section.	Revise
96	6.7	p. 213	The draft BERA states that " *the measurement endpoints are determined at the organism level*" and "*conclusions about unacceptable risk to populations and communities can by drawn only by extrapolating from potential effects in individual organisms.*" Risk was measured by using test populations (e.g., laboratory test populations of *Hyalella* and *Chironomus*) to infer risk to site populations. Effects on these populations are used to infer risk about site communities (e.g., changes in growth, mortality has been linked extensively to changes in benthic community structure - EPA 2000). For example, changes in growth in bioassay tests have been linked to changes in community structure and diversity. Organisms that do not grow properly cannot emerge from sediment to reproduce. Ability to colonize new substrate is also affected. For the benthic invertebrate tissue residue lines of evidence, effects and risk were measured on tissue composites, not individuals. The only way to truly evaluate changes in community structure associated with environmental degradation is to evaluate alterations in benthic community structure in the field. Since this evaluation was not done on the site, it must be assumed that changes in endpoints such as growth and mortality result in benthic community effects in the field. It is further stated that "*localized TRV exceedances do not indicate population- or community-level risks*". This statement is not accurate. Rather, single exceedances represent population-level effects and degradation of the benthic community in that localized area.	Issue

No.	Section	Page Line(s)	Comment	Code
97	6.7.2	p. 216	Weight of Evidence: It is determined here that the predictive models represent a stronger line of evidence than empirical data because "*the historical distribution of chemicals in sediment is limited, and sediment samples do not integrate well over a wide area*". Mapping and the food web model were then used to predict where exceedances would occur, and to identify potential risk areas (PBRAs). This is not an appropriate use of the weight of evidence approach, as the models do not incorporate empirical results from the site. Overlay each line of evidence on a map.	Issue
98	6.6.7	p. 213, Lines 6-8	Eliminate the following statement regarding TZW chemicals of concern: "~~*In most cases, where metals exceed their respective TRVs, the cause is more likely to be geochemical processes that govern partitioning from sediment rather than contribution from upland groundwater*~~." This statement is not supported by any information in the BERA.	Issue
99	6.7	p. 213, Lines 15-16	The statement "*TZW was evaluated but was not used to identify COCs and is therefore not discussed further in the conclusions.*" is a risk management decision that is inappropriate in a BERA. Table 6-28 identifies 63 chemicals (15 metals, 16 PAHs, 3 SVOCs, 6 insecticides, 16 VOCs, 5 petroleum fractions, cyanide and perchlorate) that exceed TZW TRVs in one or more samples at one or more of the 10 facilities where TZW samples are available. All 63 of these chemicals must be identified as posing unacceptable ecological risks in the risk characterization for TZW. They form a possible basis for making remedial decisions both in the in-water and upland (source control) portions of the Portland Harbor site.	Directed Change
100	6.7	6.7 p. 213 Lines 20-21	The Benthic Risk Conclusions and Uncertainty section states that measurement endpoints for benthic risk are determined at the organism level. For surface water and TZW samples compared to EPA water quality criteria, this statement is not correct. EPA water quality criteria are designed to be protective of 95% of aquatic genera (Stephan et al. 1985, p. 2). This is a taxa richness measure, which is a	Revise

No.	Section	Page Line(s)	Comment	Code
			community-level endpoint, not an organism-level endpoint. Correct all draft BERA discussions of water quality criteria as an organism-level endpoint (such as that in Section 6.7.1, p. 214) to reflect the fact that they are a community-level endpoint.	
101	6.7	pp. 219 – 232, Table 6-30 through 6-32	Tables 6-30 through 6-32 should show all lines of evidence outlined in the problem formulation including: • Empirical toxicity testing results • Logistic Regression Model Exceedances (not just the Floating Percentile Model) • Water exposure to TRVs, including surface water and transition zone water • Bulk sediment contaminant concentrations compared to sediment quality guidelines • Consensus Based SQGs (TECs / PECs and related quotients) • Mechanistic-based SQGs (Equilibrium Partitioning) • Empirical SQGs (PELs / TELs, ERLs / ERMs, AETs, LRM, and related quotients. These tables are also highly biased in the "risk conclusions sections", in almost every case concluding "negligible risks to the benthic community" based on their WOE approach.	Revise

No.	Section	Page Line(s)	Comment	Code
102	6.7.2.4	p. 233	SPI imaging shows a preponderance of oligochaete and polychaet (worms) within the benthic community. A preponderance of these kinds of organisms shows a benthic community that is significantly degraded. However, the SPI evaluation does not support the statement that "*the data suggest that the physical environment in the Study area can explain the condition of the benthic community throughout most parts of this area of the river*." It is uncertain as to what proportion of the degraded benthic community is the result of chemical or physical conditions or some combination of the two.	Issue
103	7.0	p. 237	Revise the RI Report to reflect the fact that tissue concentrations are based on composite fish tissue samples, not individuals. The RI Report should further note that TRVs are based on laboratory populations measuring effects. The language here about conservatism is unsupported unless population attributes will be measured in the future.	Clarify
104	7.0	p. 238	The report does not mention here the high degree of uncertainty associated with "information about feeding rates, foraging areas, prey home ranges, and diets" for fish species. The revised BERA should discuss these uncertainties as they relate to the strength of the line of evidence as presented here.	Clarify
105	7.0	pp. 235 - 236	The following parameters are very important variables for the dietary exposure levels: feeding rates, foraging areas, prey home ranges, and diet composition for each species. Was a sensitivity analysis done for the key variables? How were the key variables or ranges decided upon? Provide some ranges for these values to help understand how sensitive these parameters were to the calculations.	Clarify

No.	Section	Page Line(s)	Comment	Code
106	7.1.1	p. 242	Per the problem formulation, risks to carp from bioaccumulated chemicals in their tissues must be evaluated. This analysis does not appear to have been performed. Also, uncertainties of risks to carp from bioaccumulated dioxin-like chemicals in their tissues have not been discussed. If dioxin-like chemicals did not screen in, this should also be discussed in the uncertainty analysis. Both of these analyses were called for in the problem formulation, and must be performed.	Clarify
107	7.1.2.1	p. 245	Assessment Based on Individual Samples text box: Information presented in this box is misleading. Attributes to do a population-level risk assessment were not made, including concentration determinations by age class, individual concentration measurements, fecundity, etc. The BERA should be revised accordingly.	Issue
108	7.1.2.2		Predicted tissue concentrations for sculpin were based on the food web model. As part of the uncertainty analysis, use BSAFs and BSARs to validate the model predictions for sculpin. The food web model is a site-wide model, predicting average tissue concentrations for this species. It is unclear if these predictions produce accurate estimates of risk to this species.	Issue
109	7.3.1	p. 244	Include the carp home range of 3 river miles used in the exposure assumptions in Table 7-3.	Clarify
110	7, Attach. 9	pp. 248-9	Several of the fish tissue TRVs are not in agreement with the values given to the LWG by EPA. The antimony LOER is correct in the table, but should have been divided by the default acute-chronic ratio to yield the tissue TRV for the BERA. The lowest value fish tissue TRV for bis(2-ethylhexyl)phthalate is 1.6 mg/kg. As discussed in more detail in an Attachment 9 comment, the 5th and 10th percentile TRVs for cadmium, mercury, and total DDX do not appear to be correct. The 10th percentile total PCB fish tissue TRV also is not correct. Correct the TRVs for these chemicals, and use the correct TRVs to recalculate risks for fish species in the BERA.	Revise
111	7.1.3	pp. 249-50	Describe in more detail the use of the 5th percentile fish tissue whole body TRVs	Clarify

No.	Section	Page Line(s)	Comment	Code
			for juvenile Chinook salmon and Pacific lamprey ammocoetes in the BERA, as opposed to the 10th percentile TRVs used for the other fish species.	
112	7.1.3	p. 244 Table 7-5	For the final version of this document, LWG made some changes to the fish tissue DDX raw data used that changed the previously derived DDX tissue TRVs. LWG took advantage of the impact that changing a low residue-effect concentration has on the derived TRV. For example, for fish, EPA recommended they use a LOER of 1.1 mg/kg from the Allison et al. (1963) study, in which a range of residues were reported. Since tissue concentrations varied during the study, there is no way to know at what tissue concentration the toxicity effect threshold was exceeded. The conservative approach is to take the lowest number in the range to represent the residue causing an effect. This approach was used in the previous version of the TRV derivation. The least conservative approach is to take the highest concentration at the time of an effect. LWG used the least conservative approach by selecting the highest residue in the time frame in which mortality became significant. By switching to this higher concentration (3.0 mg/kg from 1.1 mg/kg, see page 14 in Attachment 9), the tissue TRV increased significantly (to 1.6 mg/kg ww) from the one originally calculated (0.68 mg/kg). Given that the endpoint is mortality, which is a severe endpoint, the lower tissue residue should be selected from this paper. Another approach is to take the median concentration to represent the range of residues experienced by the fish (1.8 mg/kg). This approach would also be better than using the highest value in the range. Use the original tissue TRV derived for DDx in fish.	Clarify
113	7.1.3	p. 251	The uncertainties presented in Table 7-6 discuss bias in one direction only. Either present bias in both directions, or delete this table.	Issue
114	7.1.4	pp. 251 - 252	In Table 7-7, present the HQs for each COPC and receptor.	Clarify
115	7.1.4.3.1	p. 260	Tissue Data from the Downstream and Downtown Reaches: Data from downstream of the study area exceed TRVs and it was inappropriate not to include these samples in the risk assessment. Since these samples were not carried	Clarify

No.	Section	Page Line(s)	Comment	Code
			through the risk screening process, it is impossible to see the COPCs that would have been identified. The "CDF approach" (Figures 7-3, 7-4 and 7-5) does not represent a risk screening. One example includes sculpin exceedances of copper at 3.1 mg/kg (east bank, 3rd highest in the river).	
116	7.1.4.3.2	p. 263	The RI Report should note that the fish collected from the upriver reach were significantly larger than the fish collected from the harbor. This point should be taken into account as part of this discussion.	Clarify
117	7.1.4.3.2	p. 265	EPA acknowledges that there are regional sources of mercury in the Willamette basin. However, the draft BERA must still evaluate the effect from local sources. Elevated levels of mercury within the site may indicate the presence of local sources.	Clarify
118	7.1.4.3.3	p. 265	In addition to averages, also consider the range and distribution of the data in this evaluation.	
119	7.1.4.4	pp. 267-269, Table 7-13	The information regarding the uncertainty of the TRVs is misleading. The species sensitivity distribution approach results in an appropriately conservative TRV protective of the majority of receptors. The BERA should be revised accordingly.	Revise
120	7.1.4.5	p. 270	In addition to black crappie and brown bullhead, also perform the evaluation presented in this section for carp.	Revise
121	7.1.3	p. 249	The selection of the 5th and 10th percentile for protection of threatened and endangered and populations, respectively, is justifiable and should be supported in the BERA text.	Revise
122	7.1.4.2.1	p. 255, Table 7-8	In this table, present individual composite risk, not using at 95% UCL concentration – this is only shown in Attachment 12. This table should be similar to Table 7-10 for smallmouth bass. Chemicals that screen in on a individual composite basis should be carried forward into the risk characterization. Present maps on a composite sample-by-sample basis for chemicals that screen in. HQs for carp would be significantly higher for Total PCBs. Large home range fish such as largescale sucker, peamouth and pacific lamprey ammocoetes had the	Revise

No.	Section	Page Line(s)	Comment	Code
			following changes from the SLERA and refined screen: Largescale Sucker: Chromium (2.77 mg/kg), BEHP (3 mg/kg), 4,4'-DDD (0.15 mg/kg) and Total DDX (0.67 mg/kg) were all dropped in the final risk characterization step. Lamprey ammocoetes: Diethyl phthalate, and 4,4'-DDD (max detect 0.0547 mg/kg) were all dropped and not discussed here. These were due to uncertainties in the TRV, high detection limits, and changes in the TRV, respectively.	
123	7.1.4.2.2	Table 7-9	Several COPCs are dropped from the SLERA and refined screening, including BEHP, 4,4'-DDD, 4,4,'-DDT, and beta-HCH. BEHP was dropped because of "uncertainty with the TRV" (instead, discuss in Uncertainty section), even though there were significant exceedances of both the TRV used in the SLERA and refined screen (0.39 mg/kg) and the final TRV (9.6 mg/kg) (max detect was 28 mg/kg). 4,4'-DDD was dropped because the TRV went from 0.054 mg/kg to 1.6 mg/kg total DDX TRV (highest detect 4,4'-DDD was 0.305 mg/kg), and 4,4,'-DDT was dropped because the TRV went from 1.7 mg/kg to 1.6 mg/kg Total DDX TRV (highest detect 4,4'-DDT 1.7 mg/kg). These congeners should have been carried forward, not just total DDx. Beta-HCH was dropped because TRV went from 0.0049 mg/kg to 0.20 mg/kg (highest detect was 0.0062 mg/kg). This process drops localized effects from the risk characterization process. Maps presented on a composite sample-by sample basis are only for the refined list, which is misleading.	Issue
124	7.1.4.2.2	Table 7-10	This table should not drop BEHP, which had 2 exceedances of the TRV at 87 mg/kg and 32 mg/kg. Table 7-7 (p. 254) also show these exceedances. Therefore, it is unclear why Table 7-10 does not show the BEHP as "area specific tissue 10th percentile LOAEL HQ". This COPC should not be dropped due to "uncertainty in the TRV." This is not appropriate. Re-evaluate antimony risks using the correct BERA TRV of 1.1 mg/kg. Total DDx and 4,4'-DDD were also dropped in this step because the TRV went from 720 mg/kg to 1,600 mg/kg from the screening steps to final selected TRVs, a change that was not approved by EPA. Retain the	Issue

No.	Section	Page Line(s)	Comment	Code
			original BERA DDx and 4,4'-DDD TRVs.	
125	7.1.2.2	p. 242-3, Table 7-4; also Att. 4, Table 4-10	This table indicates that the mechanistic model was used to predict tissue concentrations of beta-HCH in sculpin. However, Table 4-10 of Attachment 4 does not report predicted concentrations for beta-HCH. It only lists predicted sculpin tissue concentrations for total PCBs and total DDx.	Issue
126	7.1.4.3.1	pp. 257-8, Figures 7-3 to 7-5	Given the high site fidelity of sculpin (0.1-mile range according to this assessment), you cannot characterize fish tissue residues in the 3.5-mile downtown reach and the 1.9-mile downstream reach that bracket the study area with only 2 sampling locations in each reach. Approximately 40 sites were used to characterize the 9.9-mile study area. More locations outside the study area should be sampled before comparing these areas to the study area.	Issue
127	7.1.4.3.2	pp. 260-61, Figures 7-7, 7-8	The sparse amount of fish tissue data is insufficient to characterize the 13.1-mile upriver reach. Data for a total of 13 fish and 4 lamprey ammocoetes collected over 4 years is presented. It is misleading to say that lamprey ammocoetes collected from the upstream reach have higher mercury and copper concentrations than those in the study area when only 4 individuals from the upstream reach were used for comparison. The error bars on Figures 7-7 and 7-8 suggest that there is high variability with these analyses, and the standard deviation should be reported for these concentrations. More locations outside the study area should be sampled before comparing these areas to the study area.	Issue

No.	Section	Page Line(s)	Comment	Code
128	7.2; 8.1	Multiple pages and line numbers	There appear to be two technical errors in the calculation of risks to fish and wildlife from ingestion of contaminated diets. 1.) Calculating dietary risks by adding together the two hazard quotients for risks from ingestion of contaminated prey and risks from ingestion of contaminated sediment. Total risks from all components of the diet should be calculated by summing the ingested doses from sediment and contaminated prey ingestion, then calculating a single hazard quotient combining risks from the two dietary fractions. The equation for this was given as Equation 1 on page 40 of the February 15, 2008, Problem Formulation. It appears as though LWG has summed the hazard quotients from the two dietary fractions to obtain total risk, rather than the correct approach of summing the two ingested dose estimates, then calculating a single hazard quotient. EPA does not object to the LWG approach of quantifying risks separately from sediment ingestion and contaminated prey ingestion, as this provides useful information. However, the total dietary risk calculations should be corrected as described earlier in this comment. 2.) In the situation where only one of the two dietary fractions (either sediment or prey) has a hazard quotient > 1, the BERA shows the final HQ as only the HQ from the pathway with HQ > 1, not the sum of both HQs. This is not correct. Total risk is that from the sum of ingested doses from sediment and prey. The LWG approach underestimates total dietary risks. Another problem with the BERA approach is the situation where both sediment and prey ingestion HQs are between 0.5 and 1.0, in which case the BERA drops both dietary fractions and concludes that chemical does not pose a risk. One could have a situation where prey HQ = 0.7 and sediment HQ = 0.7, for example, yielding a total HQ of 1.4 and a chemical of concern. The BERA approach would not identify such a chemical as posing risk to ecological receptors. Dietary ingested doses must be summed before calculating the total dietary HQ, even when both individual components of the diet (sediment and prey) have individual HQs < 1.	Issue

No.	Section	Page Line(s)	Comment	Code
129	7.2.2.2	p. 227 ff	The draft BERA creates and applies separate tissue and sediment thresholds to calculate HQs from the exposure data for prey and sediment (Eqs 7-4 and 7-5). While the HQs are added in the final analysis, which is equivalent to Eq. 7-3, it was not clear whether some fish risks were underestimated because they were screened out in the earlier steps of the screening process when the prey and sediment consumption data were not combined. The BERA should clarify this point.	Clarify
130	7.2.4.1	p. 287	Step 2 should reference Table 7-17, not Table 7-15.	Revise
131	7.3	p. 315	It is not appropriate to calculate 95% UCL on water concentrations for comparison to larger home range fish. Even if they are wider ranging, they will still be exposed above chronic or acute TRVs during some time frame. All fish except sculpin were evaluated as 95% UCL on the mean over some exposure area. For all practical purposes, all fish should be evaluated on a sample-by-sample basis. Per the problem formulation, "*compare every individual water sample to water TRVs. Consider exceedance of acute or chronic values at any scale a risk (near bottom and integrated) due to lack of sufficient samples to accurately obtain better exposure resolution*". Therefore, the assessment for sculpin, with the addition of the peristaltic samples, should be used to assess risk to all fish. This is presented in the text, but not in Table 7-36, where only 1 mile exposure areas are presented, but see Maps 6-30 through 6-34. There are several widespread exceedances – esp. of DDx and isomers – that support the conclusion that these compounds present a site-wide risk to fish receptors, contrary to the conclusions made in the tissue residue section. While inappropriate, the 95% UCL values used in the risk assessment, along with distribution types, and Pro UCL recommended UCLs are not presented here or in Attachment 4 as stated, making it impossible to see how conclusions would change. While 95% UCLs may be presented somewhere in the document, we have been unable to locate them.	Issue

No.	Section	Page Line(s)	Comment	Code
132	7.3.2.1	p. 318	It is not appropriate to drop the results from the peristaltic samples where XAD was collected in the same area. Just because the XAD is based in high resolution does not mean that it represents the same exposure point concentration in terms of spatial and temporal distribution, nor does it represent the same filter size for evaluating total and dissolved metals (XAD was a bigger filter size).	Issue
133	7.3.3.3, 7.3.3.3.1, and 7.3.3.3.2	pp. 323-325	EPA now has a much expanded literature review available on the behavioral effects of copper to fish, including salmonids, than was available to share with LWG during the preparation of the draft BERA. EPA can share the expanded review with all interested parties, including the LWG. Based on our updated literature review, EPA believes that the major uncertainty regarding copper effects on fish behavior, including avoidance responses and the potential to interfere with migration, is the difference in the olfactory threshold concentrations (i.e., the lowest concentrations of copper in water a fish can smell), and the higher threshold concentrations of copper in water required to elicit behavioral responses. The olfactory and behavioral threshold concentrations are not the same. A brief revised discussion of this is warranted in the BERA. It should also be recognized that olfaction is a suborganismal endpoint involving multiple tissues and organs, whereas behavior is an organism-level response to contaminants.	Clarify
134	7.3.3.3.1	p. 319	This section should be revised. The statement that the impairment of olfactory systems in fish due to metals exposure is temporary is misleading. The re-growth of new cells has been shown in the lab following exposure, but only in non-contaminated water.	Issue
135	7.3.4	p. 325	Section 7.3.4, Risk Characterization: This section should be revised to incorporate the comments on the previous sections. Do not use 95% UCLs on the mean and alternative TRVs should not be used.	Revise

No.	Section	Page Line(s)	Comment	Code
136	7.4.4	p. 339	Even though there are no complete studies that link population-level effects to PAH-caused skin lesions in fish, this does not mean that this risk can be ignored. There are plenty of studies linking various skin lesions to fish mortality on individual- and population-level scales. The bulk of this research stems from the aquaculture industry's investigation into the effects of sea lice on salmon populations and other causes of skin lesions in farmed fish. Benthic fish would also be more susceptible to bacterial infections facilitated by skin lesions than pelagic species due to the lower dissolved oxygen concentrations found near the water/substrate interface in many aquatic environments.	Note
137	7.5	p. 340, paragraph 4, last sentence	Considering the lack of a dietary exposure line of evidence for lamprey ammocoetes, the decision to not evaluate lamprey exposure to TZW is inappropriate. Lamprey should be evaluated for exposure to TZW. Note that a variation of this comment was provided previously in EPA's December 23, 2009, initial risk assessment comments.	Issue
138	7.6	pp. 341, 346	The discussion on Barnthouse et al. (2009) is misleading and the Barnthouse study is flawed and not representative of the situation in Portland Harbor. Remove the final sentence on page 345; it is inconsistent with EPA policy and direction on risk assessments.	Issue
139	7.6.1	p. 347	Aluminum, cadmium and lead body burdens are not regulated by fish species. Move these chemicals to the non-regulated category of the table. The maximum cadmium concentration in smallmouth bass using the correct tissue TRV yields a hazard quotient greater than 1. Therefore, add cadmium to the list of chemicals posing potentially unacceptable risk for empirically measured fish tissue chemicals.	Revise
140	7.6.2	pp. 347, 348, 353 – 362.	Tables 7-39 and 7-40: Revise these tables in accordance with comments on previous sections.	Revise

No.	Section	Page Line(s)	Comment	Code
141	7.6.2	p. 350	There is no basis for the BERA to conclude that there is no population risk.	Revise
142	7.6.3	pp. 346-7	Avoid statements declaring that no unacceptable risks exist when HQs are > 1. Note that a variation of this comment was provided previously in EPA's December 23, 2009, initial risk assessment comments.	Issue
143	7.6.3	Table 7-40	Almost all of the statements in the Risk Conclusions columns are biased in one direction and fail to consider all sources of potential bias. Whenever an HQ is ≥ 1, the table always states that risk is overestimated. There is uncertainty in both directions at each step in the processes they followed. Either highlight the major uncertainties and direction of bias, if known, for each step, or eliminate this column. This comment also applies to Table 11-2.	Directed Change
144	7.6.3	Table 7-40	The Effects Considerations column frequently contains arguments against the conclusion of risk when HQ is greater than 1. Remove the text in the "Effects Considerations" column for TBT. There is insufficient information provided to evaluate the study, and this is not the place for this discussion. Similarly, the discussion should be eliminated for PCBs. This comment also applies to Table 11-2.	Revise
145	7.6.3	Table 7-40	For TBT risk to Largescale sucker and Chinook salmon, the risk conclusion of no unacceptable risk is unacceptable. Any LOE with an HQ ≥ 1 should be identified as posing unacceptable risk. Revise this table accordingly. This comment also applies to Table 11-2.	Directed Change
146	7.6.3	Table 7-40	Under the exposure considerations column, the BERA states that the diets are not representative for the species under consideration. However, the concentrations in other potential food sources may be greater (or less) than the ones analyzed, and therefore, the "no unacceptable risk" conclusion is unsupportable. Revise this table accordingly. This comment also applies to Table 11-2.	Issue

No.	Section	Page Line(s)	Comment	Code
147	7.6.3	Table 7-40	For PCBs in tissue, selected LOAEL is not highly uncertain. Uncertainty is within normal range of uncertainty. Also, no mention is made about how well residue concentrations in PH were characterized for each receptor. There are many uncertainties with the limited residue data available for comparison. Revise this table accordingly. This comment also applies to Table 11-2.	Revise
148	7.6.3	pp. 353 ff	Revise this table to include only the COPCs, the HQs for each LOE, and the locations of HQs > 1. The "Risk Conclusions" summaries for many of the substance and resources include unwarranted conclusions regarding the interpretation of risks, emphasizing only the uncertainties that justify a conclusion of no or minimal risk, e.g., seeming to give more weight to the low concentrations in water compared to measured tissue concentrations. This comment also applies to Table 11-2.	Revise
149	7.6.3	pp. 349 ff	The risk conclusions presented in the BERA tend to discount the importance of HQs >1 that were calculated for localized areas. The BERA states that localized areas of risk are not indicative of population level risks. These conclusions inappropriately dismiss the utility of the finding in supporting the identification of locations where the COPC concentrations are sufficient to warrant isolation from exposure to fish and other resources. Revise the BERA accordingly.	Revise
150	8.0	p. 465, Figure 8-4	Figure 8-4 is quite helpful. If possible, provide a similar figure to represent the uncertainty analysis based on fractions of prey for fish, birds, and other mammals.	Clarify
151	8.1.2.1	p. 371	The BERA should clearly describe the risk characterization results based on the EPC approach outlined in the problem formulation. Some of this information is only presented in attachments to the BERA.	Revise
152	8.1.2.1	p. 369, Equation 8-2	Why is the HQ for incidental sediment exposure not multiplied by a factor for the portion of the diet in this equation? The equation appears incorrect. See previous comment on this topic, and revise the text accordingly.	Clarify

No.	Section	Page Line(s)	Comment	Code
153	8.1.2.2.1	p. 375	Remove the "SUF" from Equation 8-3. The problem formulation directed all to be evaluated as using the site year-round. If an SUF is to be used, it would not be in the denominator, but a factor applied to the after TRV/FIR/BW. Was a factor different from 1 used in this equation?	Revise
154	8.1.2.2.2	pp. 372-373	Osprey egg data are undergoing data validation. This data can be used to validate the bird egg line of evidence. Further discussion may be required to figure out how to incorporate into process.	Issue
155	8.1.3.2.1	p. 404	Express the bird egg TRV units in the table as mg/kg wet weight in the egg, not as mg/kg body weight/day, as currently given in the table.	Edit
156	8.1.2.3.2	p. 379	Based on no BSAR relationship found by the LWG using Willamette River data, the conclusion here is that the BMF approach is unreliable except for total TEQ, and later is dismissed entirely as a line of evidence. EPA disagrees with this position and believes that the BMF approach should be used to estimate risk and develop PRGs. The "factor" approach is defensible compared to the "regression" approach. This is the same argument used to dismiss relationships between sediment and tissue. The data and analysis used to calculate the BMRs should be submitted for review. However, the BMF of 10 should be used instead of the BMR presented here. Ultimately, osprey egg concentration data will be available to confirm this relationship.	Issue
157	8.1.2.4	Table 8-8	The use of this methodology was addressed by EPA's problem formulation, which stated, "*vary prey items probabilistically to identify components associated with the greatest risk within 1-mile segments (progressed as ½ mile increments).*" The BERA should be revised consistent with the problem formulation.	Revise
158	8.1.2.4	p. 388	Predicted tissue concentrations for shore bird prey items were based on the food web model. As part of the uncertainty analysis, BSAFs and BSARs should be used to validate the model predictions. The BSAF models for invertebrates closely tied to the sediment may be more predictive and accurate than a food web model. The criteria for developing BSARs were too restrictive for developing	Issue

No.	Section	Page Line(s)	Comment	Code
			relationships (significantly positive slope at a p of 0.05 and an r squared greater than 0.030).	
159	8.1.2.4	p. 387, Table 8-9	Several of these beach areas do not match up with shorebird sampling areas. Several addition areas can provide estimates where "none" is listed (e.g., LWG 004 at beach area B4). Simply not estimating exposure to shorebirds at all in these areas is unacceptable.	Issue
160	8.1.2.4	p. 389, Table 8-10	Section 8.1.2.4, Table 8-10 refers to the results of the mechanistic model for predicted shorebird prey concentrations. Tables with the predicted concentrations from the mechanistic model are presented in Table 3-7 from Attachment 3. However, concentrations are only presented for tributyltin ion, Total PCBs and Total DDX. Values for Dioxin/ Furan TEQ, Total TEQ, Aldrin, and Sum DDE, listed in this table as COPCs, are not presented. Were predicted concentrations not calculated for these chemicals? Only average concentrations are presented, with an associated range of values. Include a table showing the predicted concentrations for each sample used in the EPC calculations for all COIs. Since BSAFs were not calculated for modeled contaminants such as PCBs, pesticides, etc., this information is needed to ensure that modeled results are lining up with expected concentrations from other lines of evidence.	Issue
161	8.1.3.1.1	Table 8-11	Delete the LPAH and HPAH TRVs presented in Table 8-11. Evaluate PAHs using the total PAH TRV of 40 (mg/kg bw/day).	Revise
162	8.1.4.1	p. 409 [405, text box?]	Citing Barnthouse et al. (2009) here is inappropriate because this paper deals with risk assessment of fish exposed to PCBs, and for other reasons. This paragraph is repeated throughout this assessment and should be removed entirely from this section.	Revise

No.	Section	Page Line(s)	Comment	Code
163	8.2.2	Table 8-43	The BERA inappropriately discounts the bird egg line of evidence for evaluating risks to osprey and bald eagle. Table 8-43 states that the bird egg TRVs are inadmissible and that the BMF to develop exposure information is highly unreliable. EPA disagrees with this contention based on the following points: 1) The most sensitive endpoint for these contaminants is the developing embryo, and adverse impacts are measured as: eggshell thinning, moisture loss, and embryo death for DDE; and embryo mortality, inhibited development, and sometimes deformities for PCBs and dioxin-like compounds. (Note: DDT is more of a direct toxin to the adult or juvenile bird, so the dietary approach would be more appropriate than the egg approach for DDT.) The most reliable NOAELs and LOAELs for these contaminants have been derived for bird egg tissue concentrations from egg injection studies and nationwide field evaluations correlating 5-year productivity values to DDE and PCB concentrations in eggs. Hatching success studies have also been conducted on embryos collected from the wild. Egg studies focus on measuring concentrations in eggs that are associated with an adverse impact. Eggs are a common endpoint used in risk evaluations in the Great Lakes and other areas. Thus, there is greater field-based empirical information on impacts to ospreys and eagles from these compounds compared to the dietary approach or compared to other field-based evaluations. Useful field data on osprey eggs are also available directly from Portland Harbor. 2) The dietary approach to assessing risk from bioaccumulative compounds (DDE, PCBs, and dioxins) also has uncertainties associated with it that seem to be understated in the draft BERA. For example, there is huge variation in the response of birds to dietary doses of these chemicals. Gallinaceous birds tend to be much less sensitive to measurable impacts from DDE, whereas chickens seem to be more sensitive than wild birds to dioxins. Dietary-based, lab-toxicology studies have to be conducted over the long term in order to feed the test species contaminated prey items and provide sufficient time to allow buildup of the chemical, followed by egg laying and hatching to test the most sensitive endpoints. Few toxicology studies can be conducted over the course of a year	Issue

No.	Section	Page Line(s)	Comment	Code
			without introducing variables difficult to control and having uncertainty in the results. Also, the risk assessment based on the dietary approach has the disadvantage of employing a number of mathematical steps using "conservative" parameters, including food and sediment ingestion rate, percent moisture conversions, body weight, site use, exposure scale, and diet composition, each associated with some degree of error. In some cases overly conservative values are used (such as employing chicken parameters for dioxin), thus greatly overestimating risk to wildlife receptors. These additional steps add error to the dietary risk assessment, but are not needed in the more directly measured egg-based approach. The dietary approach for dioxin-like chemicals used by LWG to assess birds is also problematic because it relies on an older 1992 pheasant study where dioxin was injected rather than introduced in the diet, and there was no uncertainty factor used to evaluate risks specific to Portland Harbor species. 3) The variability surrounding the BMF values is high, especially when compared across species (which is really an inappropriate comparison) such as in Table 3-2 of Attachment 16 of the BERA, but is lower when compared within a species. The BMFs selected for use in the Portland Harbor risk assessment should not be the highest values (i.e., the most conservative values), but rather the values empirically measured for the system. Osprey in the lower Willamette River eat 99% fish; thus, they have a direct link to the river and uptake of contaminants through fish. Evaluations of osprey prey on their wintering grounds have shown no contaminants or only trace levels that are dwarfed by contaminants in prey on their breeding grounds. The BMF values calculated by Henny et al. (2003) and (2008) – 10 for total PCBs, 79 for DDE, and 10 for total TEQ – are the best empirically-based BMFs for the system. Granted, there is certainly a higher degree of error around the BMFs compared to other parameters of the risk assessment. However, the BMFs are fairly robust in that choosing a lower range of BMFs (i.e., representing other species at other sites) would not modify the end result much for either comparing to a TRV or back-calculating from a TRV to obtain a target tissue value for fish that would be protective of osprey. The same BMFs used for	

No.	Section	Page Line(s)	Comment	Code
			osprey should also be used to conduct a risk assessment on eagles that would be using Portland Harbor. 4) EPA considers the data using the egg approach as the "most appropriate for estimating risks to birds from dioxin-like chemicals", as stated in our 2003 guidance document: "*Analyses of Laboratory and Field Studies of Reproductive Toxicity in Birds Exposed to Dioxin-like Compounds for Use in Ecological Risk Assessment.*" This document uses a species sensitivity distribution to evaluate effects concentrations of dioxin-like chemicals across species. This method should be considered for use in the revised BERA.	
164	9.0	p. 473 Lines 14-16	Present transition zone water risk assessment results in the text. Not to do so is inconsistent with the ecological conceptual site model (Figure 1 of Attachment 2 of the draft BERA), which identifies amphibian exposure to TZW as a complete and significant exposure pathway, requiring full risk characterization.	Directed Change
165	9.1.4.2, 9.1.4.4, 9.2	pp. 480-486	Based on our review of site data, EPA has identified 11 surface water and 61 transition zone water contaminants with a HQ ≥ 1 for amphibians. Aluminum, can be eliminated based on previous EPA guidance to the LWG regarding the uncertainties regarding the utility of the EPA aluminum aquatic life criterion to the water chemistry found at Portland Harbor.	Directed Change
166	9.1.2	p. 475	It is unclear why certain transect sample locations (e.g., W023 and W011) are included but others (e.g., W005) are not. The RI Report should provide a table in this section that summarizes the sampling locations and their rationale for use in the evaluation of amphibians.	Clarify
167	9.3	p. 486	Rewrite the risk conclusion portion of Section 9 to identify the 11 surface water and 61 transition zone water contaminants with a HQ ≥ 1.	Directed Change

No.	Section	Page Line(s)	Comment	Code
168	9		What is the basis for statements in this table that amphibians are less sensitive to PAHs than fish or invertebrates, and that amphibian toxicity thresholds are higher than the TRVs used in the BERA? Either document or eliminate these statements.	Clarify
169	10.0	p. 493 Lines 11-12	Present transition zone water risk assessment results in the text. Not to do so is inconsistent with the ecological conceptual site model (Figure 1 of Attachment 2 of the draft BERA), which identifies aquatic plant exposure to TZW as a complete and significant exposure pathway, requiring full risk characterization.	Directed Change
170	10.1.4.2, 10.1.4.4, 10.2	pp. 499-502	Based on our review of site data, EPA has identified 11 surface water and 61 transition zone water contaminants with a HQ ≥ 1 for aquatic plants. Aluminum, can be eliminated based on previous EPA guidance to the LWG regarding the uncertainties regarding the utility of the EPA aluminum aquatic life criterion to the water chemistry found at Portland Harbor.	Directed Change
171	10.3	p. 503	Rewrite the risk conclusion portion of Section 9 to identify the 11 surface water and 61 transition zone water contaminants with a HQ ≥ 1.	Directed Change
172	11	All	The concluding section of the BERA simply does not convey either the magnitude or the extent of potentially unacceptable ecological risks at the Portland Harbor site, nor does it describe the extent of empirically measured toxicity to benthic biota. It does not provide EPA risk managers the information needed to meet one of the programmatic goals of CERCLA, which is to identify a remedy that is protective of the environment. Section 11 should be completely rewritten to give the reader a more complete understanding of the extent and magnitude of potentially unacceptable ecological risks at the Portland Harbor site than is given in the current version of this section.	Directed Change
173	11	pp. 511-513	Table 11-1 should include the appropriate HQ in place of the "X."	Revise

No.	Section	Page Line(s)	Comment	Code
174	11	pp. 511-513	Table 11-1 is an incomplete descriptor of the identified potential unacceptable risks in the BERA. In addition to not including the 63 chemicals identified as posing unacceptable risk in transition zone water, the text on page 514, lines 15-17, states that only PAHs, PCBs and DDX compounds pose unacceptable risks to the benthic community or populations. This statement is inconsistent with numerous risk characterization analyses throughout the BERA, and with the summary in Table 11-1, which itself is incomplete. At least 40 chemicals of concern from Table 11-1 are dropped as not identified as posing unacceptable risk in the conclusions of the risk characterization. This dropping of identified unacceptable risks is a risk management decision that is not appropriate for a risk assessment document, and makes the BERA unacceptable to EPA.	Issue
175	11.1	p. 506, Lines 6–10	EPA disagrees with the statement that there is negligible risk for chemicals with a HQ ≥ 1. An exceedance of a TRV (HQ ≥ 1) is evidence of unacceptable risk.	Directed Change
176	11.0	pp. 513-519, Table 11-2	Remove the column labeled "Unacceptable Risk" from this table.	Revise
177	11.2	p. 511	Remove the following statement: "~~*Although risk estimates indicate the potential for unacceptable risks in the Study Area, some risks are associated with regional rather than Study-Area-specific contamination*~~." Local vs. regional risk was not specifically assessed.	Clarify
178	11.3	p. 515, Lines 4-7	The risk characterization and conclusions are not to be based solely on spatial distribution or frequency of HQ ≥ 1.0, as claimed in the BERA text. The discussion should also consider the magnitude of risk. It is acceptable for LWG, in fact desirable, to describe the spatial pattern and limitations of identified risks, as well as to describe which contaminants are site-wide risks to multiple receptors, pose risks to only one receptor or risks in a limited area or section of the site, or something in between these two extremes. This information is useful to EPA in	Directed Change

No.	Section	Page Line(s)	Comment	Code
			identifying contaminants that will addressed by the response action. It is not acceptable for the BERA to eliminate contaminants posing unacceptable risk those chemicals for which the magnitude of risk is small (i.e., a hazard quotient only slightly greater than one), or which pose unacceptable risks in only a limited area of the site. It is only within the purview of the EPA risk managers to make the decisions regarding the basis for site remediation, and which chemicals, risks, and locations of risk require remediation.	
179	11.3	p. 515	The first sentence of the footnote states "A COC is not necessarily equated with unacceptable risk." This statement appears to be the basis for wholesale elimination of certain chemicals from the risk characterization and conclusions of the BERA of the chemicals posing unacceptable risk. EPA risk managers will ultimately decide whether or not any chemical that potentially poses unacceptable risk will be identified as a COC in the FS. It is not acceptable for LWG to make such risk management decisions, let alone make them in the BERA. Remove from the BERA all instances of inappropriate risk management decisions. However, it is appropriate for LWG to make risk management recommendations to EPA in the appropriate sections of the remedial investigation report, such as Section 11.4 of the BERA.	Directed Change
180	11.3	p. 515	The BERA must identify chemicals with hazard quotients ≥ 1.0 as posing potentially unacceptable risk. Use this information to identify COCs in the FS. This is consistent with the definition of COCs presented in OSWER 9200.1-23P (1999 guide to preparing records of decision and other remedy selection decision documents) and OSWER 9285.6-07P (2002 role of background in the CERCLA cleanup program). OSWER 9285.6-07P defines chemicals of concern as "the hazardous substances, pollutants, and contaminants that, at the end of the risk assessment, are found to be the risk drivers or those that may actually pose unacceptable human or ecological risks." EPA guidance for determining if risks are unacceptable is found in the EPA 1991 Role of the Baseline Risk Assessment in Superfund Remedy Selection (OSWER Directive 9355.0-30), which states that	Directed Change

No.	Section	Page Line(s)	Comment	Code
			where hazard quotients are less than 1, remedial action is generally not warranted. In the BERA, all chemicals with a hazard quotient ≥ 1.0, without exception, are to be identified as chemicals posing potentially unacceptable risk and carried forward to the feasibility study. The EPA risk manager will then make the determination of the basis for site remediation.	
181	11.3	Table 11-2	Under CERCLA, the BERA is an informational document, not a decisional document. The role of the BERA is to identify chemicals posing potentially unacceptable risk based upon a comparison of the risks calculated in the BERA to EPA's acceptable risk range of hazard quotients less than unity, below which remediation generally is not warranted. It is not the role of the BERA to identify a subset of chemicals posing unacceptable ecological risk based upon the justifications for risk conclusions given in Table 11-2. These justifications include but are not limited to the low magnitude of HQs > 1, disagreements between different lines of evidence regarding whether or not risks exist, the limited spatial extent of identified risks, similarities between identified site risks and risks to receptors upstream of the study area, a perceived high uncertainty and/or lack of reliability of lines of evidence, etc. The justifications given in Table 11-2 are among the considerations that EPA risk managers will use to decide risk management issues at the site. As such, the final determination as to whether identified risks are unacceptable will be made by EPA risk managers in the feasibility study and documented in the Record of Decision for the site. The risk management decisions regarding what is or is not an unacceptable risk will be made outside of the BERA. Revise Table 11-2 to delete the column "Unacceptable Risk?" The information provided in the final column should be retained to assist in the identification of COCs in the FS.	Directed Change
182	11.3	Table 11-2	The rationale for eliminating the risk to osprey from lead is unsupported by any data. The factors responsible for increasing population size may be entirely unrelated to contamination.	Directed Change

No.	Section	Page Line(s)	Comment	Code
			Eliminate this unsupported statement from the BERA.	
183	11.3	pp. 511 - 512	Either document or delete the following statement: *"Unacceptable risks to other fish, wildlife, amphibians and plants associated with PCBs and other COCs (Table 11-2) would be reduced or eliminated by sediment remedies that address mink PCB risks."* This statement is not supported by information currently presented in the BERA or RI Report.	Issue
184	11.3	p. 515, Table 11-2	Additional risk characterization / management conclusions are made by determining that chemicals with low magnitude HQs ≥1, frequency and extent pose "no unacceptable risk". All lines of evidence for benthic invertebrates, fish, wildlife receptors, amphibians and plants are dropped or "unknown." The only pathways for which unacceptable risk is identified are for Total PCBs and benthic invertebrates, birds, and mammals, total TEQ for mammals, and DDx for invertebrates. It is stated that "*other COCs were found not to pose unacceptable risk to the ecological assessment endpoints assessed in the BERA*". This is a flawed reduction in the identification of chemicals posing potentially unacceptable risk. All chemicals with HQ ≥1 should be identified as posing potentially unacceptable risk.	Directed Change
185	11.3	p. 513	As in other sections, the final risk conclusions discount many lines of evidence in concluding that no "unacceptable" risks are present for many COCs and resources. The criteria for "unacceptable" are not explicitly defined in the BERA, and appear to be in conflict with guidance from EPA which states that an HQ > 1 denotes unacceptable risk. Please address these issues and conflicts.	Directed Change
186	11.4	General	This section is the only location within the entire BERA, other than a brief mention of them in the Executive Summary, where it is appropriate for the LWG to make risk management recommendations. If the LWG desires to retain this section in future versions of the BERA, the subsection must be renamed *Risk*	Revise

No.	Section	Page Line(s)	Comment	Code
			Management Recommendations, without the word Conclusions, so that there is no confusion or misunderstanding on the part of the reader that the subsection contains only risk management recommendations, not the conclusions of the baseline ecological risk assessment.	
187	Attach. 2		In Attachment 2, discuss that limited tissue mass was available for the epibenthic invertebrate samples collected from Hester-Dendy multiplate samplers placed in the Willamette River, and that this limited the number of chemicals that could be analyzed for.	Clarify
188	Attach. 3	Table 5-1	The process in McFarland (1995) is used to adjust tissue concentrations in clams and worms to steady state concentrations. However, it appears that for the Kow in the equation, they use a variety of sources, including EPI Suite 2007, McFarland, and – for PCBs – Hawker & Connell 1988. While there are a range of Kow's available for any one compound, the reason for selecting a specific Kow is not clear. There is uncertainty with the Kow's selected, and therefore, steady state residue calculations are also uncertain. The uncertainty and direction of bias resulting from the selected Kow is not stated in the text. Provide additional details on the selection of Kow's.	Clarify
189	Attach. 4	All Tables	The tables should clarify which species have measured whole body concentrations and which have calculated whole-body concentrations.	Clarify
190	Attach. 4	Table 3-5	Pesticide values were adjusted for steady state using the approach described in Section 5 of Attachment 3. As a result, it is not clear if the detected concentrations presented in Table 3-5 are the actual measured concentrations or the adjusted concentrations. Please clarify this.	Clarify

No.	Section	Page Line(s)	Comment	Code
191	Attach. 4	Table 3-7	The average TBT worm concentration for detected samples in spreadsheet 4D is 199 µg/kg ww, not 119 µg/kg ww as listed in this table. Correct this apparent inconsistency.	Clarify
192	Attach. 4	Tables 5-1 and 6-1	Pesticide values were adjusted for steady state using the approach described in Section 5 of Attachment 3. As a result, Tables 5-1 and 6-1 should indicate which chemicals the Superscript **a** in the table legend refers to for adjusted steady-state values. In addition, explain whether the non-detected or estimated samples (J) also adjusted for steady state conditions.	Clarify
193	Attach. 5	Table 5-2	The dioxin (2,3,7,8-TCDD) surface water TRV as given in Attachment 5 (100 pg/L) is not correct. The correct TRV is 10 pg/L.	Directed Change
194	Attachment 5	General	The comments on Section 5 of the BERA also apply to Section 7.0 of Attachment 5 of the BERA.	Note
195	Attachment 5 - SLERA	General	Table 2-3 presents surface sediment COIs with no SQGs. Chemicals for which SQGs cannot be obtained should be identified as such and discussed in the uncertainty section. EPA recommends developing a comprehensive table that presents all COPCs without TRVs organized by measurement endpoint. This comment also applies to similar tables located within the SLERA (e.g., Table 3-3, Table 4-5, Table 5-3, Table 6-3).	Clarify
196	Attachment 5 - SLERA	General	Chemicals that with detection limits exceeding the relevant screening level value should be identified as such, summarized on a table and addressed in the uncertainty section.	Clarify
197	Attachment 5 - SLERA	Table 2-6	Comparison of maximum detected concentration in fish should include all fish. For example, carp concentrations here are marked with a "NE" meaning not evaluated as a receptor in the ecological risk assessment. Screening all fish insures we are adequately protecting all species with our representative fish for each guild.	Revise

No.	Section	Page Line(s)	Comment	Code
198	Attachment 5 - SLERA	Tables 4-3 and 4-4	Table 4-4 presents fish dietary screening levels. However, no screening levels are presented for PCBs and DDT. Dietary TRVs are presented in Table 4-3, Attachment G4 of the Comprehensive Round 2 Site Characterization Summary and Data Gaps Report. These TRVs should used in the screening evaluation performed in the draft BERA.	Revise
199	Attachment 5 - SLERA	Table 4-2	Each fish receptor is given a specific diet as outlined in Table 4-2. Due to the uncertainty in knowing what species different fish are feeding on, the Problem Formulation gave specific direction on how to move forward with the fish dietary evaluation. "Include realistic representations of sculpin or smallmouth bass home range (500 to ¼ mile on one side of the river). For sculpin and smallmouth bass, use a back calculation of the fish dietary risk equation to calculate an acceptable tissue concentration in prey for the protection of fish using the dietary equation, and acceptable dietary dose using EPOA direction on dietary TRVs." This analysis was to be specific to small home range fish and in doing so "will provide information about protection of larger home range omnivorous and insectivorous fish…". Acceptable tissue concentrations were to be calculation and applied to all benthic prey including (for both species) field and laboratory clams, lab worms, crayfish and sculpin. Instead, the bass evaluation is limited to worms, crayfish and sculpin.	Revise
200	Attachment 5 - SLERA	Table 8-11	Table 8-11, Bird Dietary-Dose TRVs: Dioxin / Furan TRV (also applies to PCB TEQ, dioxin / furan TEQ, PCB TEQ) and associated Threshold Tissue Concentrations. The TRV is based on the Noseck paper looking at pheasant dietary exposure to TCDD. DEQ uses the same paper in Guidance, but follows EPA's lead from the Great Lakes in including an uncertainty factor of 10 based on that fact that the NOAEL resulted from a 10-week exposure, which would have achieved only 13 percent of steady-state accumulation. They concluded that an order of magnitude lower concentration in the food could still have elicited the same tissue levels and effects (U.S. EPA 1993). The difference in this interpretation results in a TRV LOAEL TRV of 7.0	Revise

No.	Section	Page Line(s)	Comment	Code
			E-6 mg/kg/day (Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment) based on the Great Lakes work (DEQ multiplies the NOAEL x 5 to estimate the LOAEL; however the LOAEL of 1.4 E-5 could also be used incorporating the UF). This dietary TRV is also used by the RSET in bioaccumulation chapter to determine fish tissue and sediment acceptable levels. If this TRV is used instead of the LWG TRV the acceptable fish tissue level (or TSC in this document) goes from 665 ng/kg fish tissue to from 33.3 to 79 ng/kg fish tissue LOAEL) and 2.3 to 8 ng/kg (NOAEL). This dietary TRV is also more in line with the egg based TRVs (2.3E-6 LWG based on chicken; 4.0 E-4 DEQ based on pisc. birds) and corresponding fish tissue concentrations ranging from 3.2 (LWG) to 40 ng/kg (DEQ) fish tissue for protection of bird eggs (see comment on chicken TRV for bird egg). The use of a more relevant TRV puts the both bird lines of evidence on the same scale, and results in similar risk determination (it should be noted that egg based and dietary based LOAEL values DEQ uses are the same - 40 ng/kg ATL in fish). Based on multiple lines of evidence, the acceptable fish tissue concentration for the protection of birds should be between 40 ng/kg (egg) to 79 ng/kg(dietary) instead of the LWG's calculated TSC of 665 ng/kg. This will change the risk analysis - namely dioxin/furan TEQ, PCB TEQ and Total TEQ would screen in for the dietary pathway (Max tissue concentration 232 ng/kg dioxin/furan TEQ; 196 PCB TEQ; 262 Total TEQ). Risk conclusions would be similar as for bird egg estimates (e.g. see Section 5.2 in Attachment 17.	
201	Attachment 5	p. 12	The procedure used to calculate ingested dietary dose in the refined screen should be more clearly described. According to the EPA problem formulation, the refined screen should be performed as was the dietary screening done in the SLERA (i.e. using NOAEL ingested dose toxicity values), with the option of using species specific home range data in the refined screen. The intent of this refined screen procedure was to identify portions of the site for a given COPC that could be eliminated from further dietary risk analyses in the BERA. The correct ingested dose calculation was given as Equation 1 on page 40 of the EPA problem formulation. It called for summing ingested doses from sediment and prey into a	Revise

No.	Section	Page Line(s)	Comment	Code
			single ingested dose value for use in risk estimates. This equation is not presented in Attachment 5; risks appear to have been calculated separately for ingestion of prey and incidental ingestion of sediment, assuming the ingested dose from the other contaminant source was zero. The total ingested dose from prey and sediment combined is what determines unacceptable risk. Results of the dietary dose refined screens for fish, mammals and birds should clearly show how the ingested doses were calculated, or the analyses repeated if necessary to ensure that the sum of the doses from prey and incidentally ingested sediment were used in the refined screen to estimate risks.	
202	Attach. 9, Section 7.1.3	Table 7-5 and TRVs presented in Attach. 9.	Four of the fish tissue chemical TRVs given in this table are not consistent with the TRVs negotiated with and sent to the LWG during the summer and fall of 2008. The specific differences are as follows, with the EPA tissue TRV given first, followed in parenthesis by the LWG value in Attachment 9: • Cadmium 5th percentile 0.09 mg/kg (all values whole body, wet weight) (0.17 mg/kg) • Cadmium 10th percentile 0.12 mg/kg (0.22 mg/kg) • Mercury 5th percentile 0.05 mg/kg (0.37 mg/kg) • Mercury 10th percentile 0.14 mg/kg (0.44 mg/kg) • Total PCB 10th percentile 0.62 mg/kg (0.93 mg/kg) • Total DDX 5th percentile 0.46 mg/kg (0.76 mg/kg) • Total DDX 10th percentile 0.68 mg/kg (1.60 mg/kg) Although some of these differences may be due to differences in the software used to calculate 5th and 10th percentiles (BurrliOZ vs. @Risk), for DDX, and possibly other chemicals, the difference is due to changes to the underlying toxicity data sets agreed to between EPA and LWG, resulting in higher TRVs. The EPA-LWG agreed to datasets must be used to derive the TRVs, and no changes to them should be made. EPA also requires the output of LWG's @Risk	Issue

No.	Section	Page Line(s)	Comment	Code
			calculations for distribution fitting and 5th and 10th percentile calculations. For instances where TRV differences are due solely to the use of different software, EPA agreed to use the @Risk values, but this needs to be confirmed as the cause of the differences before EPA will agree to use the higher TRVs.	
203	Attach. 9, Section 7.1.3	Table 7-5 and TRVs presented in Attach. 9.	Given the discrepancies in the fish tissue TRVs, the fish data need to be reevaluated for cadmium, mercury, total PCB, and total DDX risks. The maximum DDX concentrations found in northern pikeminnow, sculpin, and smallmouth bass have hazard quotients greater than 1 (using the 10th percentile TRV). Maximum cadmium concentrations in smallmouth bass exceed the correct cadmium TRV, so cadmium needs to be added to the fish tissue contaminant of concern list.	Revise
204	Attach. 9, Section 7.1.3	Table 7-5 and TRVs presented in Attach. 9.	Enter the copper in fish tissue TRVs of 2.4 mg/kg (10th percentile) calculated by EPA into the table, and use this value as appropriate in the BERA. Based on our subsequent evaluation of nutritional needs of fish for copper (October 2008), no toxicity should be identified in the BERA if fish tissue concentrations are 2.2 mg/kg or lower, higher than the EPA-calculated 5th percentile fish tissue TRV of 2.0 mg/kg. As a goal of the BERA is not to identify risks from nutritional deficiency, we recommend that no unacceptable ecological risks be identified in fish with 2.2 mg/kg or lower copper whole body wet weight concentrations, and that the 2.4 mg/kg value be used as the 10th percentile TRV. This will require reanalysis of the copper in fish tissue data, and also a comparison with background tissue data, if available, to determine if potential copper risks are background or site-related.	Clarify

No.	Section	Page Line(s)	Comment	Code
205	Attach. 9, Section 7.1.3	Table 7-5 and TRVs presented in Attach. 9.	There appears to be a little confusion regarding the lindane fish tissue TRV. The EPA-calculated 5th and 10th percentile-based TRVs were 0.06 mg/kg and 0.24 mg/kg, respectively. The table gives the correct SLERA screening value of 0.023 mg/kg, but an incorrect LOER concentration of 0.2 mg/kg (correct LOER is 0.14 mg/kg for rainbow trout [Ramamoorthy 1985]). If the LOER is actually a rounded version of the 10th percentile TRV of 0.24 mg/kg, it should be placed in the correct column of the table, and the lindane in fish data rescreened to determine if lindane is a chemical of concern in one or more fish species in the BERA. The 5th percentile value of 0.06 mg/kg should also be entered into the table and used in the BERA as appropriate.	Clarify
206	Attach. 12	Table 3-3	The HQ evaluation for white sturgeon stated that COPCs that only exceeded the HQ for sediment ingestion, i.e., had no prey item that had a HQ >1, were excluded from further consideration. The ingested dietary doses from sediment and prey should first be summed, then a single hazard quotient should be calculated. HQs for sediment should not be summed; only the ingested doses should be summed.	Revise
207	Attach. 12	Table 3-4	The data in Table 3-4 indicate that the sum of the HQs for copper for clam and sediment and for stomach content and sediment were greater than 1. However, copper was eliminated from further consideration. It should be retained based on a HQ greater than 1.	Revise
208	Attachment 14, Section 2	3	Table 2-1 summarizes the COPCs included in the dietary TRV review. TRVs used in the BERA are presented in the appropriate section of Appendix F. On April 11, 2008, EPA provided the LWG with recommended TRVs for use in the BERA. This set of TRVs included dietary fish TRVs for PCBs and DDT. The BERA should include fish dietary TRVs for PCBs and DDT as presented in Table 2 of EPA's April 11, 2008 TRV document.	Revise
209	Attachment 14, Section 2	3	Table 2-1 summarizes the COPCs included in the dietary TRV review. TRVs used in the BERA are presented in the appropriate section of Appendix F. On April 11, 2008, EPA provided the LWG with recommended TRVs for use in the	Revise

No.	Section	Page Line(s)	Comment	Code
			BERA. This set of TRVs included a bird dietary TRV for total PAHs but not for high and low molecular weight PAHs. The risks to birds based on dietary exposure to PAHs should be evaluated using the total PAH TRV presented in Table 3 of 2 of EPA's April 11, 2008 TRV document.	